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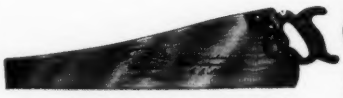
The INDUSTRIAL-ARTS MAGAZINE

MAY
1926

THE BRUCE PUBLISHING COMPANY
MILWAUKEE - WISCONSIN

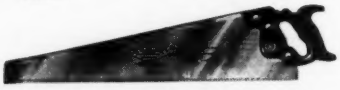
ATKINS SILVER STEEL SAWS

A Perfect Saw for Every Purpose



"THE 400" SHIP PATTERN

"The 400" is made of Silver Steel, Mirror Finish, Solid Rosewood handle Perfection Pattern, which prevents wrist strain.



ATKINS No. 53 REGULAR PATTERN

A most popular Atkins saw, No. 53, Silver Steel blade, Damaskeen finish, handle of Applewood, Perfection Pattern, embossed. Each work bench should have a No. 53.

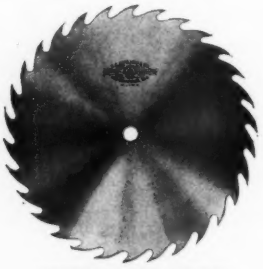
ATKINS No. 3 NEST OF SAWS

Atkins No. 3 Nest of Saws is very popular in schools where high grade tools are appreciated. 12 inch keyhole blade, 14 inch Compass blade, 18 inch Metal Cutting blade, with interchangeable handle.

ATKINS No. 1 MITRE SAW

The fine quality of Atkins Silver Steel is also found in our Mitre Saws. 4 inches to 6 inches under back to tooth edge and in lengths of 18 inches to 32 inches. Genuine Applewood handle.

Atkins Silver Steel Narrow Band Saws are recommended for better and accurate work. Made in widths of ⅛ to 1¾ inches. Try a pair.

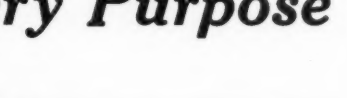


ATKINS SOLID TOOTH CIRCULAR SAWS

For your circular saw table Atkins Silver Steel Circular Saws cannot be beat. The results from using Atkins will prove absolutely that they are "The Finest On Earth."

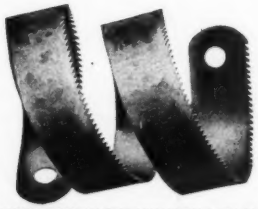
ATKINS GRINDING WHEELS

Acrolite Grinding Wheels for saws, knives and tools. Ferrolite Grinding Wheels for brass, copper, chilled iron, etc. Send for our Grinding Wheel book.



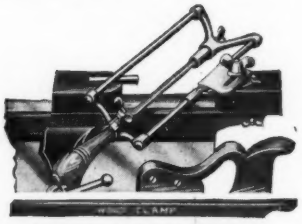
ATKINS BLUE STAR KNIVES

Atkins Blue Star High Speed Steel Knives; the latest development in high grade machine knives. They have no equal for wearing and cutting qualities.



ATKINS NON-BREAKABLE BLADE

To those who have suffered a heavy loss on account of breakage the Atkins Non-Breakable Hack Saw Blade will prove extremely profitable.



ATKINS HAND-SAW FILER

Every school should have at least one Atkins Hand Saw Filer. Easily operated by the youngest mechanic.

Atkins Always Ahead

The Finest on Earth

Leading Manufacturers of Saws, Saw Tools, Machine Knives, Grinding Wheels, and Distributors of Cantol Belt Wax. Send for second edition of our No. 19 Catalog, 264 pages, also write for literature.

E. C. ATKINS & COMPANY

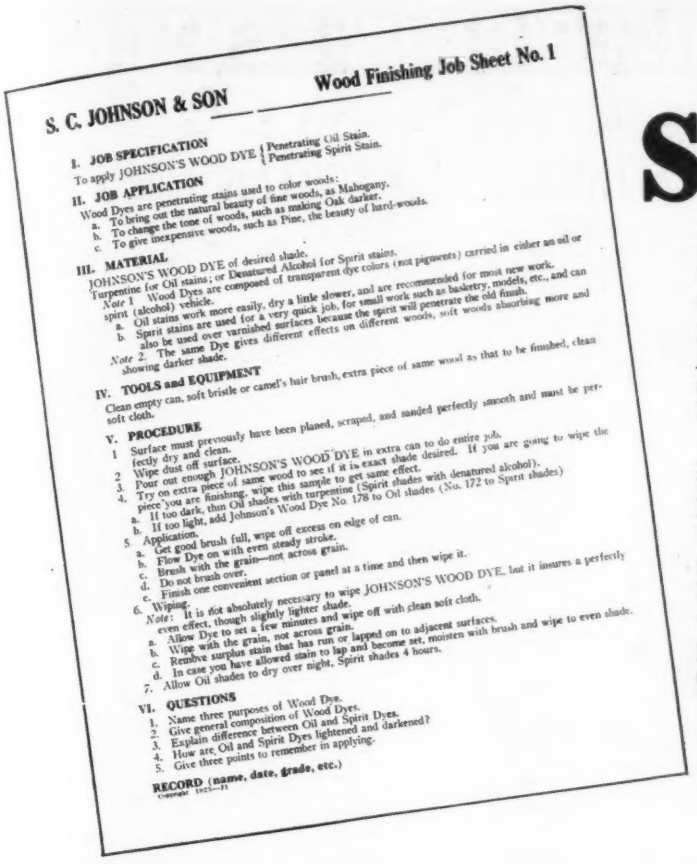
Established 1857 — ***The Silver Steel Saw People***

Machine Knife Factory: Lancaster, N. Y.

Home Office and Factory: INDIANAPOLIS, IND.

Canadian Factory: Hamilton, Ont.

Atlanta
New York
New Orleans
Minneapolis
Seattle
San Francisco
Portland
Memphis
Chicago
Vancouver, B. C.
Paris, France



S. C. JOHNSON & SON — Wood Finishing Job Sheet No. 1

I. JOB SPECIFICATION
To apply JOHNSON'S WOOD DYE { Penetrating Oil Stain. / Penetrating Spirit Stain.

II. JOB APPLICATION
Wood Dyes are penetrating stains used to color woods:
a. To bring out the natural beauty of fine woods, as Mahogany.
b. To change the tone of woods, such as making Oak darker.
c. To give inexpensive woods, such as Pine, the beauty of hard-woods.

III. MATERIAL
JOHNSON'S WOOD DYE of desired shade.
Turpentine for Oil stains; or Denatured Alcohol for Spirit stains.
Note 1. Wood Dyes are composed of transparent dye colors (not pigments) carried in either an oil or spirit (alcohol) vehicle.
a. Oil stains work more easily, dry a little slower, and are recommended for most new work.
b. Spirit stains are used for a very quick job, for small work such as basketry, models, etc., and can also be used over varnished surfaces because the spirit will penetrate the old finish.
Note 2. The same Dye gives different effects on different woods, soft woods absorbing more and showing darker shade.

IV. TOOLS and EQUIPMENT
Clean empty can, soft bristle or camel's hair brush, extra piece of same wood as that to be finished, clean soft cloth.

V. PROCEDURE
1. Surface must previously have been planed, scraped, and sanded perfectly smooth and must be perfectly dry and clean.
2. Wipe dust off surface.
3. Pour out enough JOHNSON'S WOOD DYE in extra can to do entire job.
4. Try on extra piece of same wood to see if it is exact shade desired. If you are going to wipe the piece you are finishing, wipe this sample to get same effect.
a. If too dark, thin Oil shades with turpentine (Spirit shades with denatured alcohol).
b. If too light, add Johnson's Wood Dye No. 178 to Oil shades (No. 172 to Spirit shades)
5. Application.
a. Get good brush full, wipe off excess on edge of can.
b. Flow Dye on with even steady stroke.
c. Brush with the grain—not across grain.
d. Do not brush over.
e. Finish one convenient section or panel at a time and then wipe it.
6. Wiping.
Note: It is not absolutely necessary to wipe JOHNSON'S WOOD DYE, but it insures a perfectly even effect, though slightly lighter shade.
a. Allow Dye to set a few minutes and wipe off with clean soft cloth.
b. Wipe with the grain, not across grain.
c. Remove surplus stain that has run or lapped on to adjacent surfaces.
d. In case you have allowed stain to lap and become set, moisten with brush and wipe to even shade.
7. Allow Oil shades to dry over night, Spirit shades 4 hours.

VI. QUESTIONS
1. Name three purposes of Wood Dye.
2. Give general composition of Wood Dyes.
3. Explain difference between Oil and Spirit Dyes.
4. How are Oil and Spirit Dyes lightened and darkened?
5. Give three points to remember in applying.

RECORD (name, date, grade, etc.)

JOB SHEETS

Have you ever wished for something that would save you half the endless explaining you have to do? Could your students use a clear, simple, *practical* outline that would enable them to do their job right and know WHY they are doing it?

Johnson Job Sheets on Wood Finishing cover the application of Stain, Filler, Under-Lac (shellac), Enamel, Undercoat, Wax, Varnish and Varnish Rubbing. They combine the latest and best educational practice with the most expert practical experience. And to all users of Johnson Finishes they are

FREE

Making the Most of Your Budget

How do you buy? A pint of this, and a gallon of that, just as the need comes? Just any "varnish" or "stain" somebody shoves across the counter? Sometimes good, sometimes bad?

Those boys learning to do things Right, deserve the Best—perfect materials and reliable materials every time. But the busy instructor or supervisor hasn't time to "shop." The easiest solution in the world is the Special JOHNSON SCHOOL ASSORTMENT.

This Assortment will take care of 99% of your shop needs. It will give your students the finest materials manufactured and the funds available for your department will go farther and enable you to accomplish more.

The Johnson's school assortment includes **FREE** demonstrating materials — display panels — Text-books —a complete set of Job Sheets for *every boy* in your classes. And it will save you money!

Ask about it NOW!

S. C. JOHNSON & SON, Dept. IA5, RACINE, WIS.
"The Wood Finishing Authorities"

Please send me a specimen set of Johnson Job Sheets and all information concerning your Special School Assortment of Johnson Finishes.

Name .....

Position .....

School .....

City and State .....

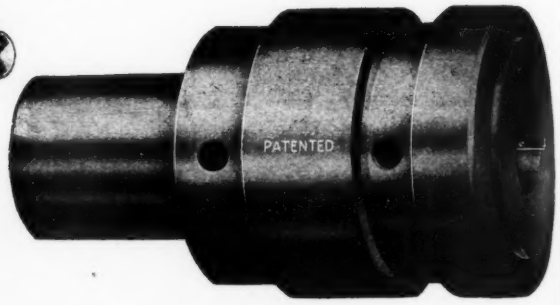
THE JOHNSON FRICTION CLUTCH

as used in the Manual Training Departments of

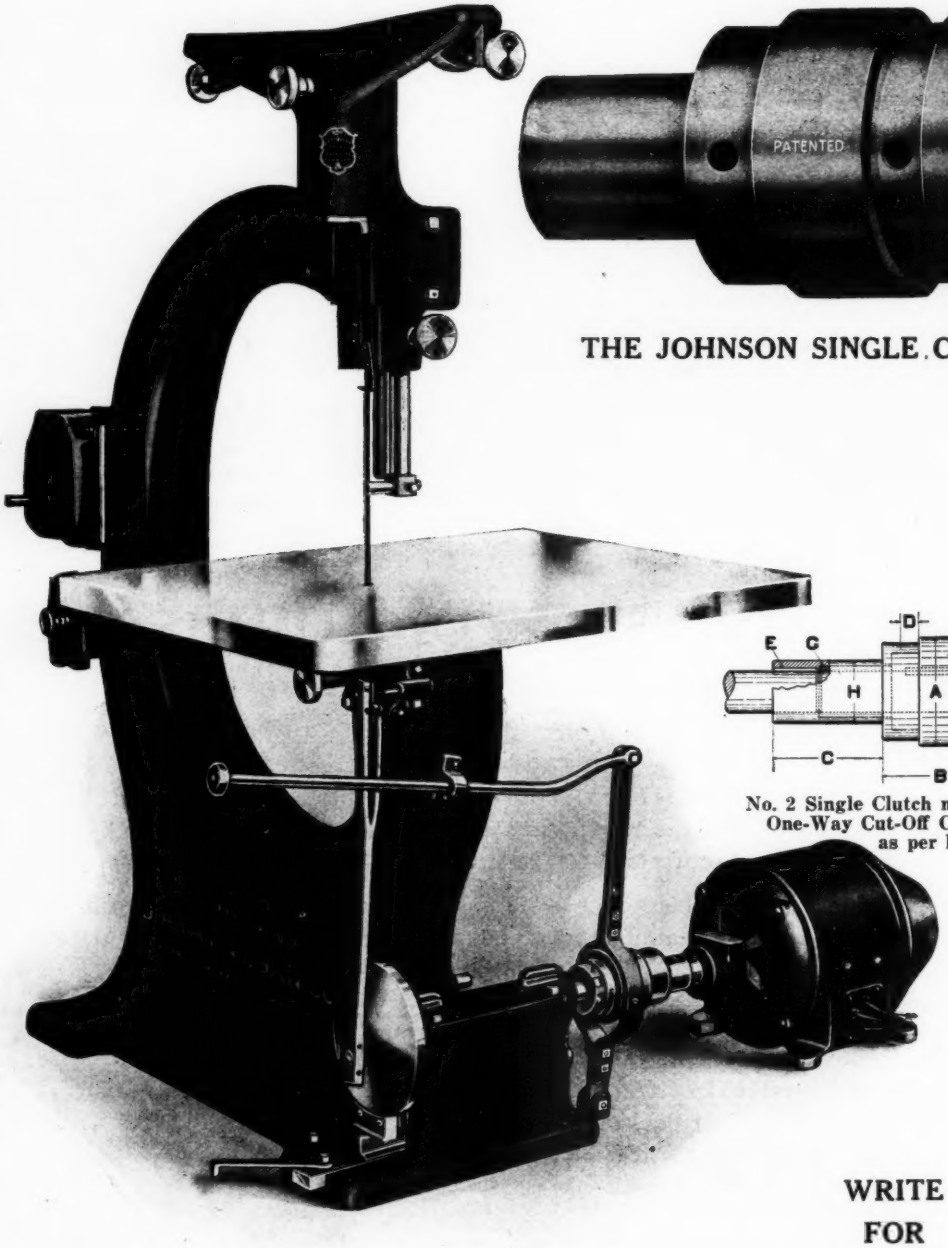
TECHNICAL HIGH SCHOOLS AND UNIVERSITIES

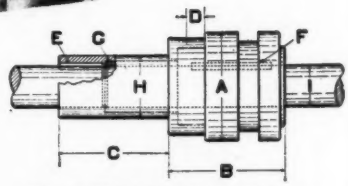
ON

A No. 6 Lightning Scroll Saw



THE JOHNSON SINGLE CLUTCH



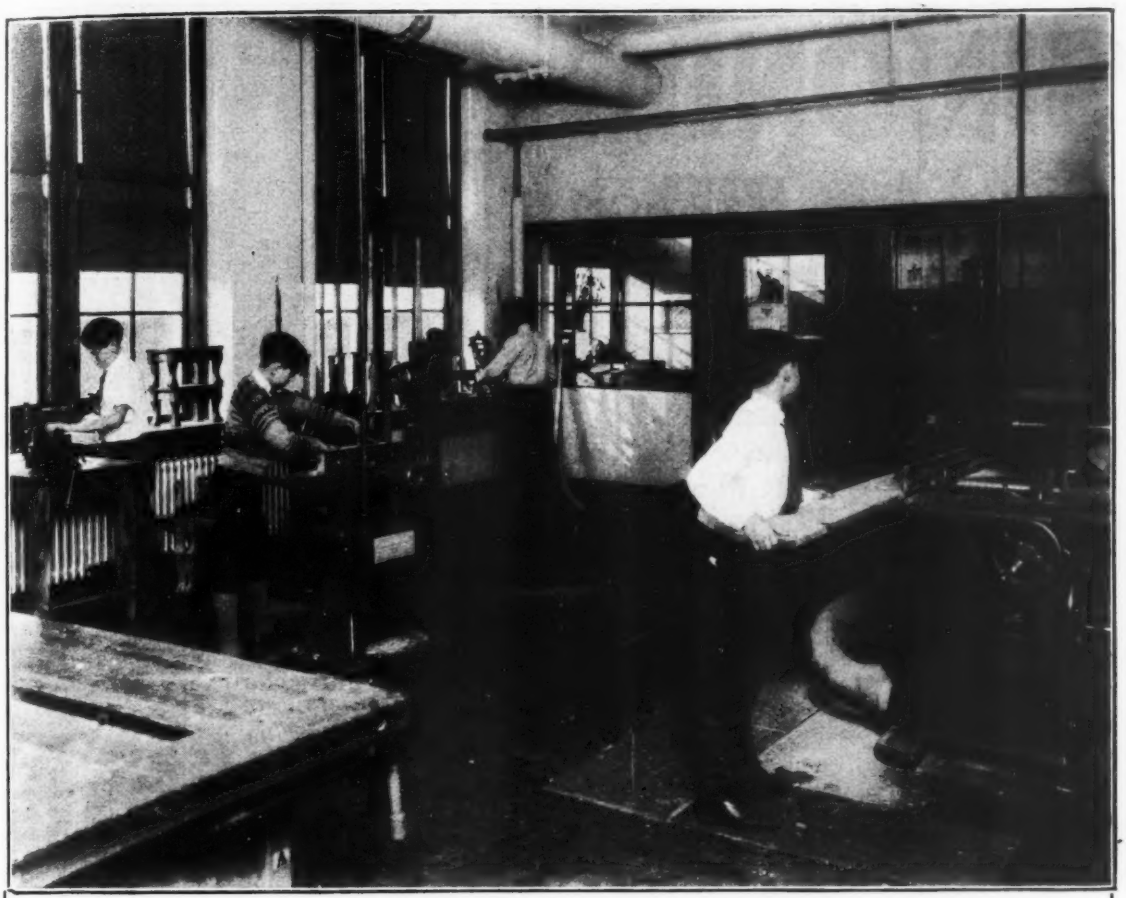


No. 2 Single Clutch made as a One-Way Cut-Off Coupling as per line cut.

WRITE FOR CATALOG "IAM"

Courtesy: The J. A. Fay & Egan Co. Cincinnati, Ohio.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.



View in Wood Shop, Nathaniel Hawthorne Junior High School, Yonkers, N. Y.

"Oliver" Woodworking Machinery in Yonkers Schools

Nathaniel Hawthorne Junior High School

No. 35 Motor Arbor Band Saw
No. 90 Universal Saw Bench
No. 51 Motor Head Speed Lathe
No. 51 Speed Lathe with carriage
No. 91 Hollow Chisel Mortiser
No. 166 16" Motor Hd. Jointer
No. 144 6" Jointer on Column
No. 585 Oilstone Tool Grinders (2)
No. 184 Belt Sander
No. 192 18" Band Saw

Roosevelt High School

No. 51 Motor Head Speed Lathes
No. 192 18" Band Saw
No. 585 Oilstone Tool Grinder

Saunders Trade School

No. 60 Universal Saw Bench
No. 166 12-inch Jointer
No. 51 Speed Lathe with carriage
No. 144 6" Jointer on Column
Four No. 51 Motor Head Speed Lathes

Yonkers High School

No. 16 Band Saw
No. 1 Wood Trimmer
No. 24 Pattern Makers' Wood Lathe

"Oliver" Woodworking Machinery

is selected for its safety features, for the many years of satisfactory service it gives, and because it best meets the needs of the Manual Training and Vocational Schools.

Oliver Machinery Co., Grand Rapids Mich.

SIMONDS

Blue Ribbon HAND SAWS

For better work in the school shop and longer service select Simonds Blue Ribbon Hand Saws. They are fast-cutting, edge-holding Saws, that withstand hard usage and give the best results. They are the Saws that are absolutely guaranteed.

Write for catalog and prices.

Edge-Holding

Fast Cutting

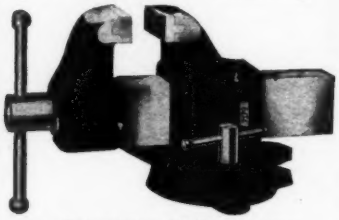
SIMONDS
Saw and Steel Co.
Established 1832
FITCHBURG, MASS.

TEACH THEM ON VISES
They Will Eventually Use

Columbian Vises on the Instructor's Bench give students an advantage when they leave school and take up their various trades.

When they go to work, they find familiar tools to work with — almost everywhere.

You can equip all departments of your school with Columbian Vises. There is a type and size for every purpose.



Columbian Malleable Iron Machinists' Vise.

Columbian Manual Training Vises.

Literature gladly sent to instructors on request.

The Columbian Hardware Company
Cleveland, Ohio

COLUMBIAN

Maydole
Hammers
Hit Manual Training Needs

You want the budding carpenters and machinists under your charge to learn the value of fine tools.

Maydole Hammers are as fine as human skill and experience can produce. And they're so much stronger and more durable than ordinary hammers that you'll find them actually more economical in the long run. Inquire of your dealer or write us for Catalog 23 "H."

THE DAVID MAYDOLE HAMMER CO.
Norwich New York

Maydole Hammers — YOUR HAMMER SINCE 1843

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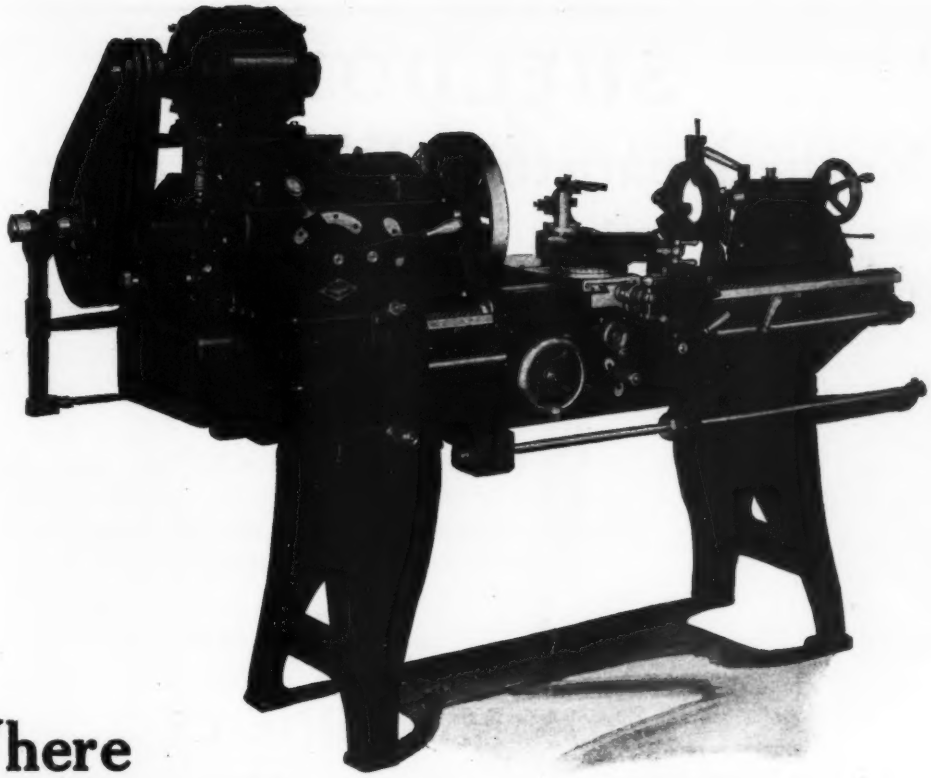


Where Else Can You Buy a Lathe Like This for $740?

—14″ x 6′ Size —8 Speed —All Geared Head

All geared head type means ***safety*** — always a big factor in the schoolroom — and quicker, more accurate work. It is the type of machine your students will find in production shops.

This 14″ x 6′ medium pattern lathe, Sidney Built throughout—with wide, deep mesh, machine cut, all steel gears, full quick change gear box, 2 face plates, steady rest, follow rest and compound rest with micrometer adjustment, apron control, and suitable motor mounted for belt or silent chain drive.

You get all these features for $740 — backed by the standing Sidney guarantee that if any Sidney Built machine is not satisfactory, you can ship it back at our expense.

Let us send you our new illustrated bulletin fully describing this efficient, low priced schoolroom lathe. Address Dept. 405.

The Sidney Machine Tool Company
Sidney, Ohio

Sidney Lathes

BUILT FOR SERVICE

SIDNEY SERVICE

SHELDON
Motor Headstock Wood Lathes

We offer in this new Sheldon Motor Headstock Manual Training Lathe a machine that can be operated by the most inexperienced or careless student with the least possible danger of injury to the electrical equipment or himself.

Motor and controller are fully inclosed. Beds are large, heavily ribbed and very rigid. Tailstock and tool rest are clamped to bed by improved quick action eccentric lever clamps.

Complete data will be sent on request.

SHELDON MACHINE CO.

3253-55 Cottage Grove Ave. **Chicago, Ill.**

Improve Your Shop Equipment

Huther Bros. Dado Head

A Huther Brothers Dado Head will speed up and simplify your intricate cutting and grooving. It consists of two outside cutters and enough inside cutters to perform the required cut. The cutters can be used in pairs or in any combinations desired.

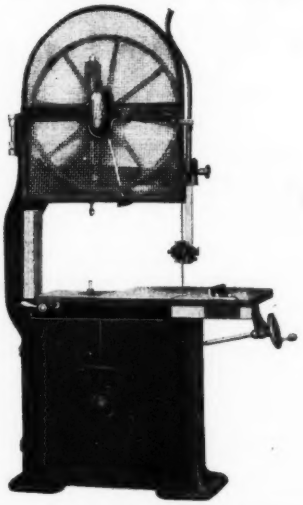
Huther Bros. Cutter Head

Huther Brothers Round Cutter Head is especially desirable for jointing and running light mouldings on saw mandrels. The knives are set with the use of a headless set screw and flanged side plates strengthen the head and keep knives from twisting while being set.

HUTHER BROTHERS SAW MANUFACTURING COMPANY
Rochester, N. Y.
Makers of Better Saws for More Than 50 Years

Write for catalog No. 46 illustrating and describing the entire Huther Line.

NEW NO. 185 BAND SAW



With babbitted or ball bearings

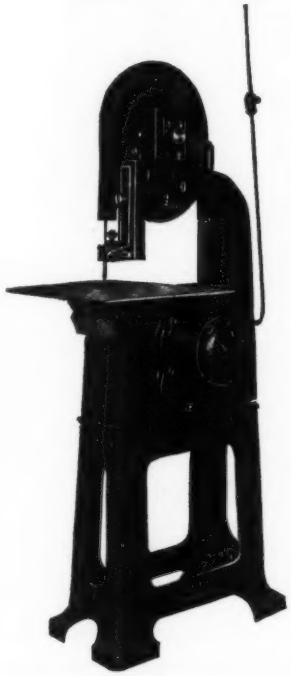
No. 185 New Model Band Saw is a medium weight, easy running machine. It embodies all the latest improvements. Built in two sizes, 30 and 36 inch.

Request complete description

Hall & Brown Wood Working Machine Co.
Broadway, Tyler and Ninth Streets
ST. LOUIS, U. S. A.

Six Necessary Requirements

of Machinery for the School Wood Shop



1—Sufficient power to handle ALL the work.

2—Ability to handle precision operations.

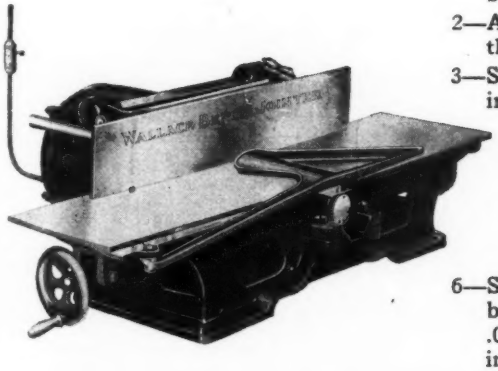
3—Guarded so boys can operate safely.

4—Economical—to prevent needless expense.

5—Portable—to utilize space efficiently.

6—Rugged—to give years of uninterrupted service.

Wallace Portable Individual Machines Have These Qualifications—And Many More



1—Wallace Machines are direct motor driven — no slipping belts.

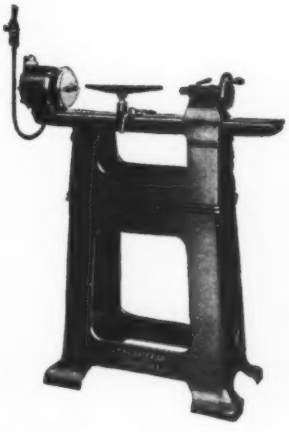
2—Are absolutely dependable on the finest work.

3—Safe in themselves—aided by ingenious guards.

4—Low in original cost—no installation expense—small maintenance.

5—Easily portable—operate from the ordinary lighting circuit.

6—Sturdy construction, dynamic balancing of all moving parts .002" machining limit; rigid inspection.



Wallace PORTABLE MACHINES The Ideal School Equipment

Are You on Our Mailing List for Solar-Wallace Job Sheets?

J. D. Wallace & Company

140 So. California Ave., Chicago

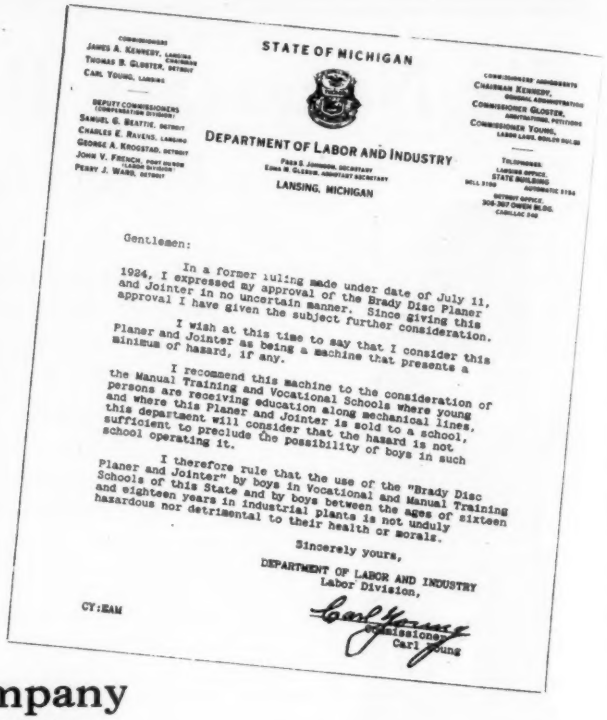
J. D. WALLACE & CO.
140 So. California Ave.,
Chicago, Ill.
Please send me your Catalog 403.

Name .....

Address .....

City ..... State .....

Approval of this New Type of Woodworking Machine



STATE OF MICHIGAN

DEPARTMENT OF LABOR AND INDUSTRY

LANSING, MICHIGAN

Gentlemen:

In a former ruling made under date of July 11, 1924, I expressed my approval of the Brady Disc Planer and Jointer in no uncertain manner. Since giving this approval I have given the subject further consideration.

I wish at this time to say that I consider this Planer and Jointer as being a machine that presents a minimum of hazard, if any.

I recommend this machine to the consideration of the Manual Training and Vocational Schools where young persons are receiving education along mechanical lines, and where this Planer and Jointer is sold to a school, this department will consider that the hazard is not sufficient to preclude the possibility of boys in such school operating it.

I therefore rule that the use of the "Brady Disc Planer and Jointer" by boys in Vocational and Manual Training Schools of this State and by boys between the ages of sixteen and eighteen years in industrial plants is not unduly hazardous nor detrimental to their health or morals.

Sincerely yours,

DEPARTMENT OF LABOR AND INDUSTRY
Labor Division,

Carl Young
Commissioner

CY:EAM

Literature on request—Dealers write for our Proposition

Brady Machinery Company

Traverse City Michigan

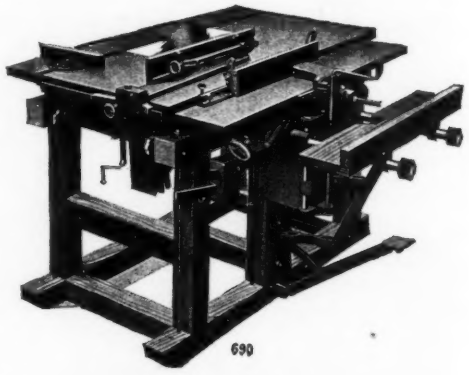
The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self feed rip saw.

THE CRESCENT MACHINE CO.

25 Main St.,

LEETONIA, OHIO.



690

This machine *is a whole woodworking shop in itself!*

With one of these American variety woodworkers in your manual training shop there is not a woodworking operation which cannot be performed well and quickly. It does fourteen different kinds of work. Three students can work at it at once.

When you write inquire about our Sander, Universal Saw Bench, Lathe and Band Saw.

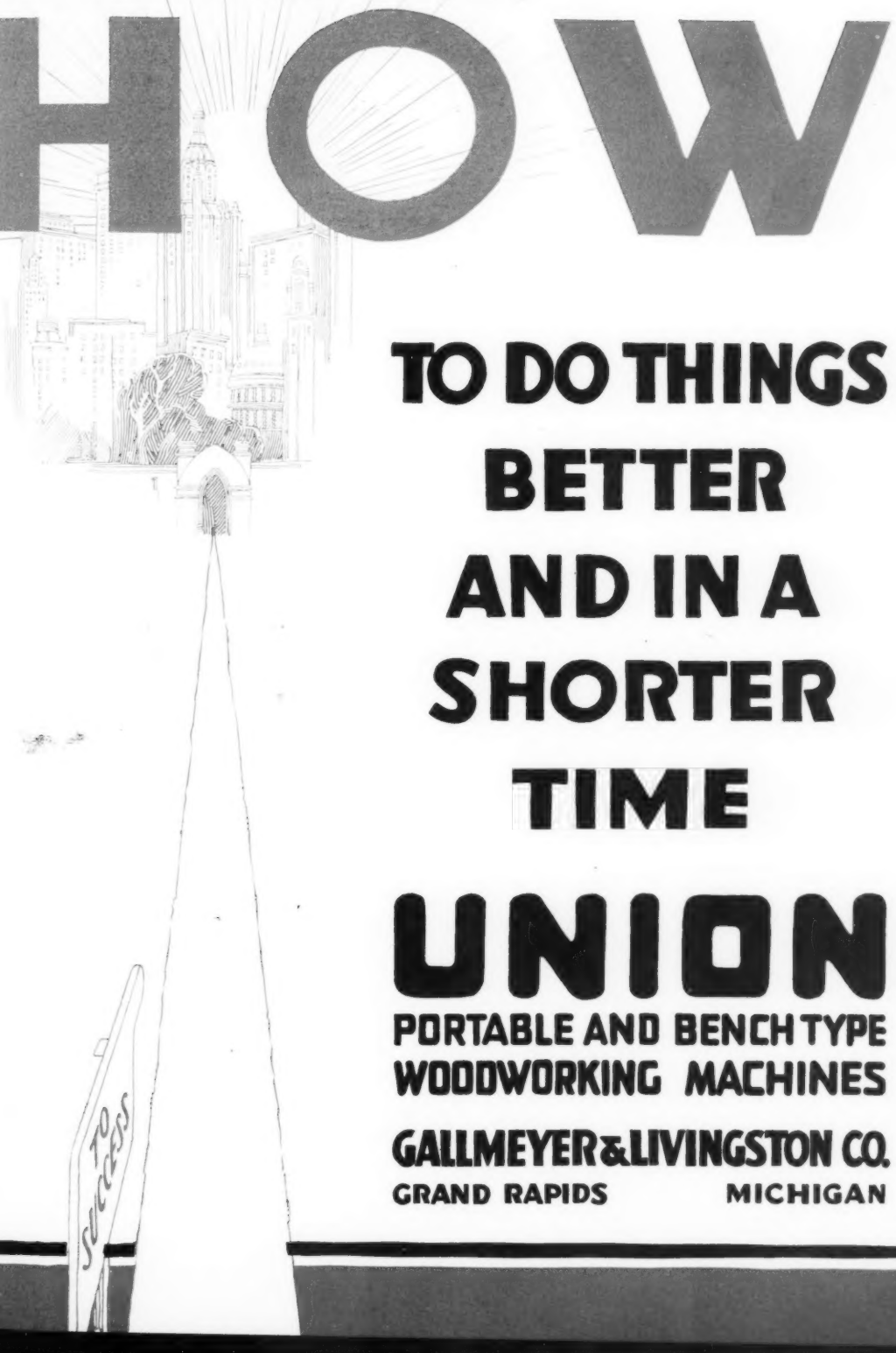
AMERICAN

SAW MILL MACHINERY CO.

MAKERS OF WOODWORKING AND SAW MILL MACHINERY

74 MAIN STREET, HACKETTSTOWN, N. J.

TEACH THEM HOW



TO DO THINGS BETTER AND IN A SHORTER TIME

UNION

PORTABLE AND BENCH TYPE
WOODWORKING MACHINES

GALLMEYER & LIVINGSTON CO.
GRAND RAPIDS MICHIGAN

HOW TO DO THINGS BETTER AND IN A SHORTER TIME

UNION

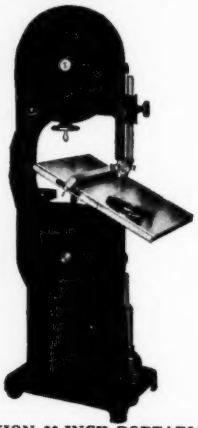
PORTABLE AND BENCH TYPE WOODWORKING MACHINES

Union machines are being selected by progressive woodworking shops everywhere because they are ideally suited to modern conditions.

Union machines are rapid, accurate, portable and low in initial and upkeep costs. They will give your students a real picture of the way modern business speeds production and improves the quality of the product.

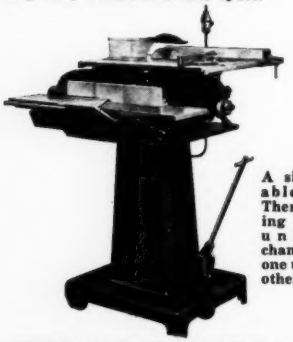
Because they are so compact, Union woodworkers leave plenty of room for handling stock. They can be installed where larger machines are out of the question. Because they are less expensive, you can have more of them—enabling every student to get the utmost possible in actual experience.

Write for the Union catalog today.



UNION 20-INCH PORTABLE BAND SAW

This machine will do more than three-quarters of the work usually done on a large band saw and at a saving of time, investment, operating cost, trouble and floor space.



A single portable machine. There is nothing to lock or unlock in changing from one unit to the other.

COMBINATION 6-INCH JOINTER AND UNIVERSAL SAW BENCH

Costs less to buy and to operate. Within their capacity, they are equivalent to any regular full size hand jointer. They will do small work better at less cost.

UNION 6-INCH HAND JOINTER

A high grade machine which is "easily taken to the work." A child can pull it around.

UNION UNIVERSAL SAW BENCH

Gallmeyer & Livingston Co.

514 Straight Avenue

Grand Rapids, Michigan

Gallmeyer & Livingston Co.,
514 Straight Ave.,
Grand Rapids, Mich.

Send me your catalog and price list.

Name .....

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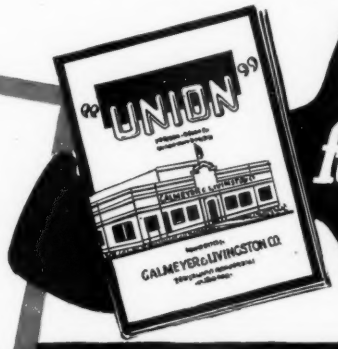

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The Standard for Quality, Design and Efficiency

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Westinghouse Rotor and Stator with windings. All other parts exclusive of bearings are our own manufacture.

Ball Bearings: Larger than those generally furnished.

Spindle: Extra large, bored and ground. All threads milled to insure uniformity. Nose and rear of spindle is 1½" O-D-10 V Threads. Morse No. 2 large taper is used for center.

Bed: Fine grey cast iron planed and frosted, broad flat top 6½" wide and crossed braced.

Characteristics

Simplicity of design
Accessibility
Sturdy construction and great strength
Extra heavy bed
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Greater load capacity due to extra large ball bearings and spindle
Smooth, quiet running
Ease of operation
Safety

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Spur and Cup Centers.

3 T-Rests, 4", 7" and 10" long.

5½" Face Plate.

Rear Face Plate and Handwheel Spanner.

3" Screw Chuck.

2¼" x 4" Right Angled Rest.

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No. 475

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THE most convenient, serviceable and efficient tool sharpening machine ever made.

This new Tool Grinder has been carefully designed to combine many new advantages with the essential features of older models. It combines five basic units in one machine: *coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel,* and all accessible from two adjacent sides.

It is motor driven, ball bearing throughout, and every unit is thoroughly guarded.

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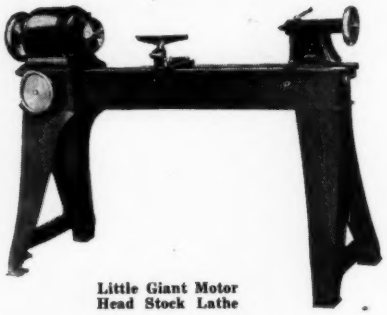

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GTD lathes were designed especially for the school shop. They will handle work of a varied nature, including straight woodworking, light metal turning, brass and aluminum turning, electrical winding and spun metal work.

Every moving part is carefully protected and all operating levers are conveniently placed. The picture of GTD lathes in a Massachusetts High School shows these details.

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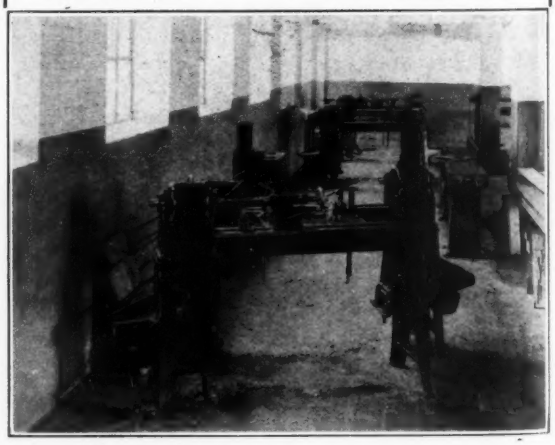

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COMBINATION WOODWORKER
without Band Saw and Mortising-
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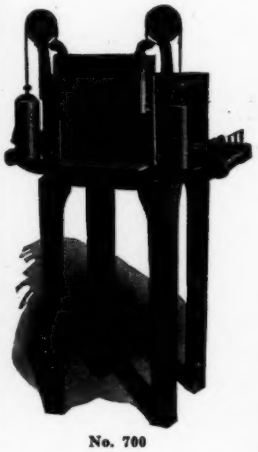

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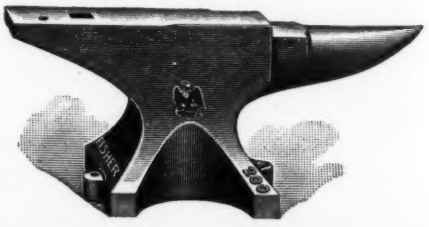

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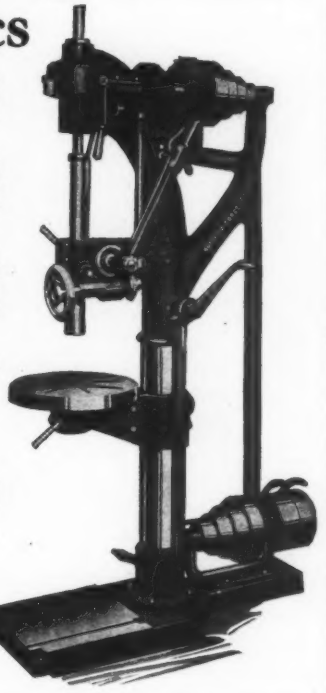

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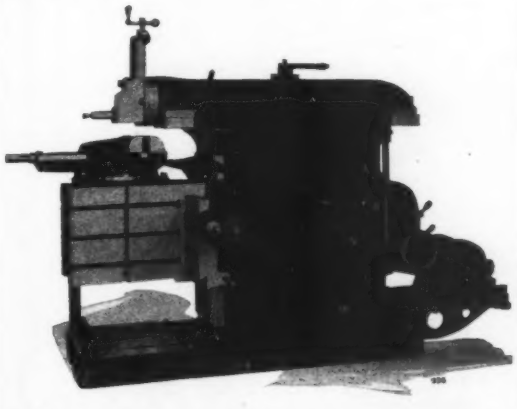
Suitable for Tool Rooms, Production Shops and Vocational Schools.



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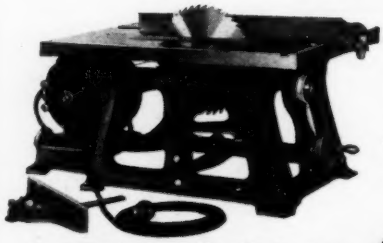
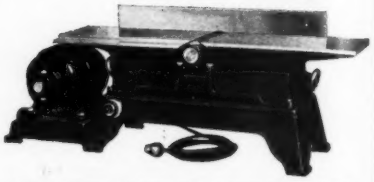


No. 8 Bench Saw Table with ⅓ or ½ H.P. Motor, 8" diameter saw. Capacity 2½" lumber. Table 15" x 20". Guard not shown.

Guaranteed accurate and satisfactory. Safe for use of students. Will handle Manual Training work better than large, clumsy, floor-type machines.



No. 6 Bench Jointer and Planer with ½ H.P. Motor. Safety head. Three 6" knives. Tilting fence. Rabbetting groove. Swinging guard not shown.

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No. 1 Bench Band Saw, 14". ⅓ or ½ H.P. Motor. Capacity under guide, 6 inches. Ball Bearing Guide. Table tilts 45 degrees.

These Bench Machines are high grade tools that sell at reasonable prices which allows the school to purchase enough equipment to give the students a practical training on woodworking machiness.

Each machine is a complete self-contained unit that connects to the lamp socket and requires no installation costs or extras. Each machine is fully guarded to protect the studeht, and comply with laws.

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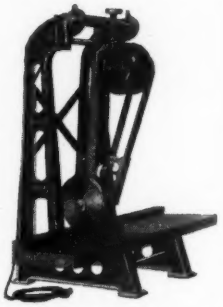

No. 5 Bench Swing Cut-Off Saw. ⅓ or ½ H.P. Motor. 8" diameter saw. Capacity 2" x 12" lumber. Cuts up material with ends smooth and perfectly square.

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"The STA-WARM is practically indestructible and because it cannot be overheated is the safest heater of which we have any knowledge."

(Signed) J. O. PAINTER,
Supervisor of Manual Training.

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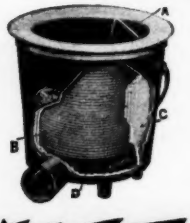

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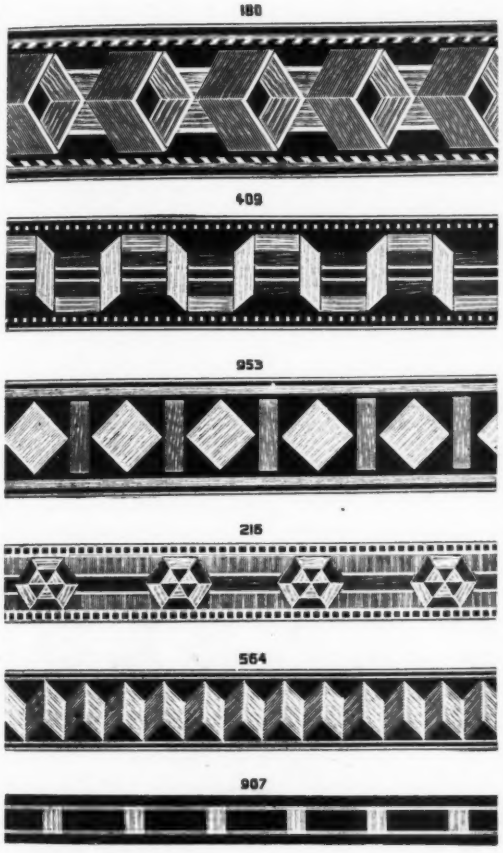

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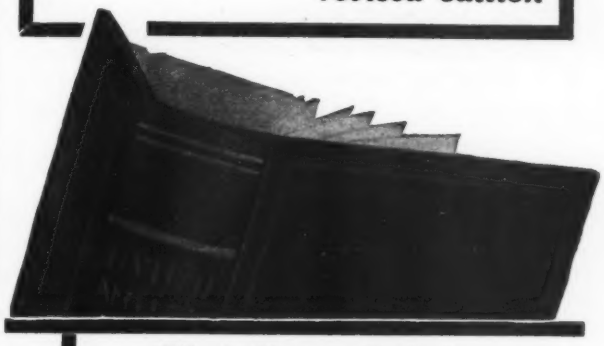

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The book presents the fundamental principles of radio so simply and clearly that any person of average training will be able to read, understand and apply them. Both the inexperienced amateur and the technically trained specialist will find the book valuable. In Chapter XI there are accurate working drawings as actually used in radio shops together with complete lists of materials required for constructing eight typical receiving sets.

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Radio practice up to the minute

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What the U.S. FOREST PRODUCTS LABORATORY says about

california SUGAR PINE

The Nation's Pattern Lumber

Technical Note No. 215, recently issued by the Forest Products Laboratory at Madison, Wisc., makes clear the fact that Sugar Pine is a *true white pine.* Read what the U. S. Government wood experts say:

"Of the dozen or so botanical species of true white pines grown in the United States, three are of outstanding importance in the lumber industry. They are eastern white pine (Pinus strobus), western white pine (Pinus monticola), and sugar pine (Pinus lambertiana). Eastern white pine grows in the northeastern and north central states. Western white pine is found chiefly in the Inland Empire (northwestern Montana, northern Idaho, and northeastern Washington). Sugar pine grows in commercial quantities in California and southern Oregon."

"There is no absolutely positive means of identifying the three white pines one from another microscopically. One familiar with the pines, however, can usually classify the species by growth characteristics."

"Sugar pine is the largest of the white pines, and most large white pine planks and timbers are cut from this species. A larger percentage of factory and shop material comes from sugar pine than from the other white pines, and less is sold as common lumber. This is probably because a larger percentage of clear cuttings can be obtained from sugar pine than from the other species."

"All the pines mentioned are comparatively easy to dry either by air seasoning or kiln drying. Sugar pine . . . . and eastern white pine are about as free from tendency to warp and twist with changing moisture content as any of our native woods."

Send for a copy of Technical Note No. 215, and our own special Information Sheet No. 13, on Sugar Pine pattern lumber.

California White and Sugar Pine Manufacturers Association

663 Call Building · San Francisco

Here are two microscopic photos, showing cellular structure of California Sugar Pine and eastern white pine. Scientists cannot distinguish between the two. (Photos by Forest Products Laboratories.)

55

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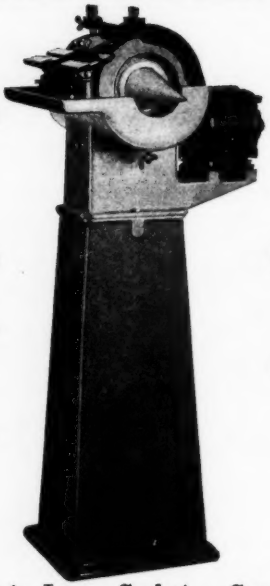

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Pedestal Type

Plugs Into Lamp Socket — Cone Wheel

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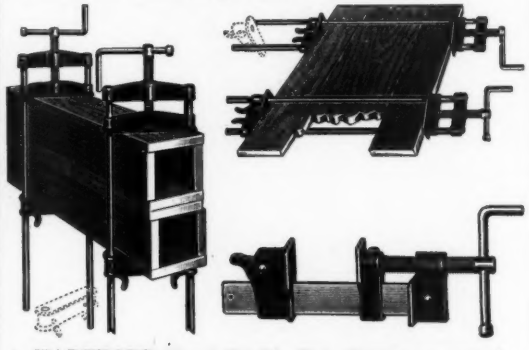
Our No. 3 Hartford Double Bar Clamps are a decided aid in class work since they eliminate the possibility of buckling. Better results are accomplished when the danger of spoiling the work is minimized. The bar on each side of the wood maintains uniform pressure.



HARTFORD No. 6 Double Bar Clamps are used extensively as presses — for veneering, gluing posts, chair arms, etc. The cost is much less and the saving worth your consideration.

Single Bar Clamps are made in Loose and Stationary Handles.

Send for Catalog No. 10, which contains complete price list on single and double bar clamps.

HARTFORD CLAMP CO.

308 Pearl St. Hartford, Conn.

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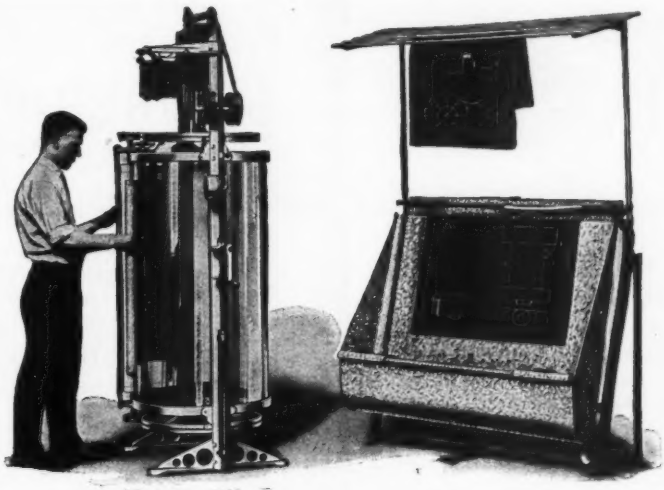

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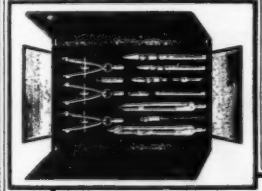

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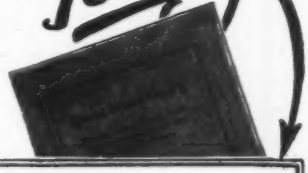

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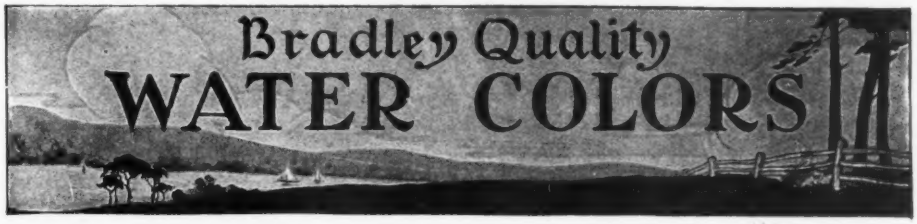

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Vol. XV
No. 5

INDUSTRIAL-ARTS MAGAZINE

May,
1926

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Published Monthly by
THE BRUCE PUBLISHING CO.
354-364 MILWAUKEE STREET
MILWAUKEE, WIS.

NEW YORK: 50 CHURCH STREET

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A Spring Job

THE preparation of lists of materials and tools for use in the school shop is one of the important Spring duties which the supervisor and the shop teacher cannot neglect. By the middle of April every teacher has a complete idea of the tools and materials which he has used during the year, and also of those utilities which he has lacked and which have hampered his work. He also has a very fair idea of the probable needs of his shop for the coming year and he should make it his especial job to prepare a complete outline of the things which he will need. Late in May and June, when examinations and commencements are the order of the day, and when preparations are being made for closing the shop for the long Summer vacation, there will be no time to make a list of materials and to draw up specifications for things needed. The month between April 15th and May 15th is, therefore, the ideal time to draw up specification lists and to prepare outlines of purchases to be made by the board of education during the Summer vacation. In this connection the advertising columns of the INDUSTRIAL-ARTS MAGAZINE will be found to contain literally hundreds of helps and hints not only directly in the advertisements, but also for catalogs and advertising materials to be obtained from manufacturers and dealers.

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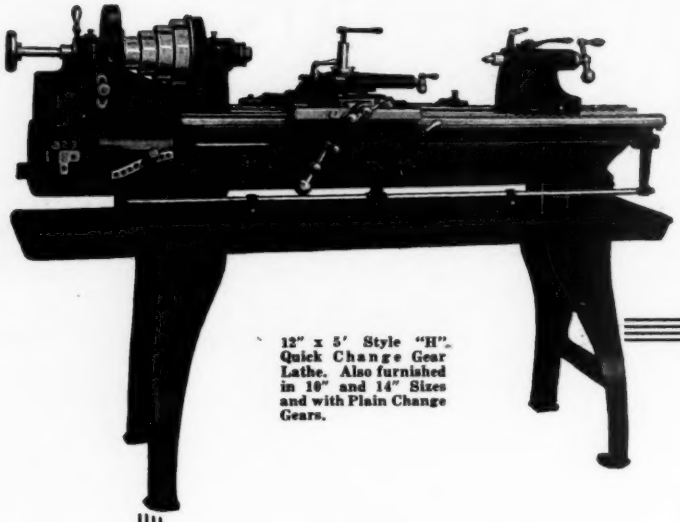
SUBSCRIPTION INFORMATION—Subscription price, $2.50 per year, payable in advance. Canadian and Mexican postage, 35 cents, foreign countries, 50 cents. Copies not over three months old, 25 cents; more than three months, 50 cents. Notices for discontinuance of subscription must reach Publication Office in Milwaukee, at least fifteen days before date of expiration. Changes of address should invariably include old as well as new address. Complaint of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

EDITORIAL CONTRIBUTIONS—The Editors invite contributions bearing upon Industrial-Arts Education, Manual Training, Art, Domestic Science, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

The Magazine is on sale at Brentano's, New York; Wanamaker's, Philadelphia; Brentano's, Chicago.



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THE INDUSTRIAL ARTS MAGAZINE

Volume XIV MAY, 1926 No. 5

Industrial Work in the Junior High School

F. D. Butler, Supervisor of Manual Arts, Canandaigua Academy, Canandaigua, N. Y.

The junior high school recognizes, possibly more fully than any other educational organization at the present time, the place of industrial experiences, paralleling the purely academic experiences during the early adolescent period of a boy's or girl's development. Perhaps a better term than industrial work would be the term "motor activity" but we shall use the accepted term "industrial."

A boy of junior-high-school age is not ready perhaps to select his life's work, along either industrial lines or the more strictly professional lines. The business of the junior high school in both its academic and industrial departments is to push back the horizon line so that the boy may be constantly getting a new view of himself in relation to the world conditions with which he finds himself surrounded. With this view of school work, the teacher of mathematics or of geography is just as much a prevocational teacher as is the teacher of printing or of cabinetmaking. In a very definite way, every teacher of a junior high school is, and should be, an educational-vocational guide.

In considering the industrial work of the junior high school we now use the word prevocational. This, it seems to me, is the correct term to use. In all of the work of the junior high school, the pupils must work with worth while material and the application must be present and not future. The chief difference between a junior high school and a senior high school lies in the fact that in a junior high school we are working with present and not in deferred values.

The number of different lines in the industrial department of a junior high school will be very largely determined by the size of the school and the community in which it is located. It is not practical for a junior high school of a hundred or two hundred students, to attempt to do all the lines of industrial work being done in a school of 1200.

Another reason why the smaller school should not try to do all the industrial work of the larger school is that the needs of the community are different.

It might possibly be advisable to "try out" a program that would "directly prepare the children to enter the local industries." However an investigation which was conducted a few years ago by Dr. L. P. Ayres, of the Russell Sage Foundation, in order to ascertain the facts concerning the conditions in 78 American city school systems, has some bearing on the claim that the intermediate or junior high school should participate in a program for industrial education "that will directly prepare the children to enter the local industries." The facts regarding the birthplace of the 13-year old boys in the public schools of those cities, which were between 25,000 and 200,000 population, show that "only one father in six was born in the city where he now lives and only a few more than one-half of the boys were born where they now live."

On the other hand experience of the past few years has demonstrated clearly that it is possible to offer well-organized units of typical activities, which will develop varying degrees of industrial intelligence and give insight into the condition in a number of modern industries without the danger of over-emphasizing the limitations in localized and undesirable occupations. This does not mean that we should be unmindful of the local needs and interests in representing and organizing industrial-arts courses for the community. The local well-being of the home and community in an agricultural section, for example, demands a somewhat different emphasis in its industrial work than would be offered to meet the needs in a city of mixed industries.

The out-of-school activities and the interests of the people are different than they are in the larger community. In the junior high school, we must endeavor just so far as possible, to give to our boys and girls experiences that are not duplicated in their out-of-school activities.

When a boy enters a junior high school where there is a variety of industrial work, I believe it unwise to ask him to make a selection of the industrial activity in which he desires to engage. If the boy's aptitude is well known to his teachers and he has had sufficient experience to make the selection, there is no serious objection to his doing so no matter what plan may be followed. Personally I feel it is hardly right to ask that a boy make a choice of the shop in which he wishes to work, before he has had any chance to explore the

various lines of work offered. While giving him this opportunity for exploration, he is not only exploring the opportunities offered in the school, but he is making very definite observations in the realm of exploring himself as an individual.

In all of the industrial work of the junior high school we are not so much concerned with the object to be made as we are with the pupil to be taught. The needs of the pupil and his desires must be the guide in determining what each individual should make as he passes through our various shops. Industrial work, to be rightly handled, cannot follow a cut-and-dried course of study based on the old idea of making a series of models or even making a series of practical, usable, articles.

A question that nearly always arises in the discussion of industrial work of any type of school is, "Should the shops be on strictly a commercial basis?" From a standpoint of organization, all of the industrial activities of either girls or boys should be organized as nearly as conditions will allow on a practical shop basis. By this I mean that the movement from one point in the shop to the other should be so planned that there will be the least amount of time and the fewest number of steps taken. I also mean that a part of the work at least should be organized so that one boy or a group of boys will do one operation a number of times, passing the product along to another group who will do another operation, sending it on through different groups until it is completed. This organization of work is desirable to give the boy an elementary insight into actual shop practices.

In the junior high school industrial work, where the idea is strictly prevocational, the shop teacher must constantly give information regarding materials used. This will naturally bring in a great many details of interesting allied information. As a boy passes through our shops we expect him to get an idea as to the goal to which this particular activity may lead him. That is, we want him to get an idea as to the allied industries of which his shop activity may be considered the foundation. In this way we impart to the boy a great deal of vocational information.

Each teacher of each subject should consider himself or herself an educational guide and therefore a vocational guide. However, it seems advisable to give a definite amount of vocational information during the three years of the junior high school work. This ought not to be done in a haphazard way. Some of it can be, and is done, through the English department. This should be continued. Some is also done in the various shops in connection with the regular work of the shop. This also should be continued. Over and above this, however, we should make a definite study of type occupations. This means not only trade occupations but professional as well. It is well to spend at least one, and in some cases two 40-minute periods a week with all of the boys taking them in small groups at which time present to them certain occupations for their consideration. For we want them to know the physical conditions necessary to carry on various lines of work, the working hours, the education necessary, etc.

Before starting on a definite study of type occupations indicated above, we should ask the boy to think of himself in relation to some line of work that he has already, in his own mind, selected for himself. Boys of junior high school age are beginning to think of themselves in terms of economic producers. They do not use this high sounding term, however, and they are not conscious of it. *Boys are thinking.* It is necessary not only that they should think, but we want them to think with a definite object or goal in view. We may ask them to select any occupation they think they would like to enter when they have to take care of themselves financially. Then we should ask them to analyze this job and analyze themselves in relation to it. Before the average boy finishes his analysis, in practically every case, he changes his idea regarding the occupation he has selected. If he does not, it would seem to me all work with him has been of very little value, as it will indicate that he has not gained a clearer insight than previously into the occupation he has selected.

It is impossible to indicate all the points covered in the "self analysis for self-guidance." I have indicated just a few. After the boy has made the selection, we should help him to discover whether or not the occupation thus selected is constant, temporary, permanent, seasonal, skilled, or unskilled. We want him to know the physical and mental requirements necessary and then to size himself up to see whether he can meet these physical and mental requirements. If he cannot meet them, say physically, there is one of two things for him to do. Either he must be willing to put himself in the right physical condition if that is possible, or he must change his selection. Many failures in this world can be traced to the fact that the physical makeup of the worker is not adapted to the work required. This is true with boys as well as with men. We also want the boy to know the time necessary to make preparation to do things that he wishes to do. We should then put it up to him to find out whether he is willing to pay this price. If he feels that financially he is not able to do it, then we want to show him how to help himself while he is preparing to enter the field he may have selected. We want him also to consider the working hours, whether it is night or day, or whether it is work that might require "split hours." We want him to be familiar with the income he may expect, the character of his associates, and his service to those associates. It is of great importance that he should consider what opportunities the occupation he has selected offers for

advanced study and for promotion. We should discuss with him the legal protection afforded the worker. Some person may say this is going into the work too much in detail. I contend that it is not because I know there is value in it. In the first place it connects the boy's school work with the world in which he lives. He is less likely to seek "blind alley" jobs.

Following this analysis we may get together the boys who indicate a desire to follow the same general line of work. If, for instance, several want to be electrical engineers, we can get them together with the instructor in the electrical department, who is perhaps a practical electrical engineer. He considers in detail with these boys this special line of work. We may do the same with boys who would like to be printers or wish to enter any of the allied printing trades. Occasionally we may find boys who want to be doctors or dentists. We should advise them so far as we can.

Let the junior high school people, the academic teachers, industrial teachers, and principals consider the work first, last, and always from the standpoint of the individual. The junior high school is a democratic institution, and will become to a still larger extent, a greater democratizing factor in our educational system. The industrial department is not a flavor or a sauce, but it is a vital part of the educational work of the junior high school. It is just as important in itself as is history or geography. It is a means that we use for helping and directing the boy to discover himself. It is a means and not an end in itself. The end of all education is that the individual may become an economic social asset and not a liability.

The Three Fathers

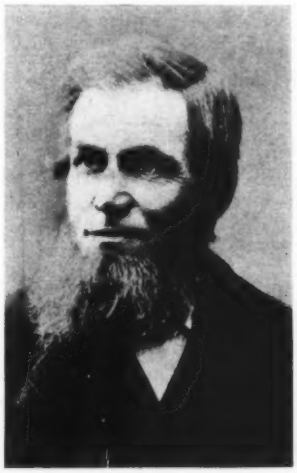
(A Semi-Centennial Narrative)

Charles P. Coates, Los Angeles Schools

IT was on a stairway landing in one of the exhibit buildings of the Philadelphia Centennial Exposition in the year 1876 that the thing happened; on a stairway landing so dark that "few saw what was placed there to be seen." Low against the wainscot of this obscure landing was a small showcase, bearing the dimly discernible tariff marks of a foreign exhibitor. Inside the case and attached to its back panel was a unique collection of small objects deftly wrought in iron —in iron from the convict mines of Siberia. A man stood peering into this case and eagerly scanning these objects.

Worthy the consideration of a master of chiaroscuro is that historic happening—the inception of the theory of manual training; the dark stairway, the Russian case, and the man eagerly scanning the symbols of iron. Writing long afterwards, the man, who was John Daniel Runkle, President of the Massachusetts Institute of Technology, told in an interesting address how he had come to the Centennial in an expectant and hopeful frame of mind and had searched untiringly until his happy finding of the exhibit from the Imperial Technical School of Moscow. Through his brilliant exposition of the educational significance of the iron symbols in that exhibit, he gained fame as an educational innovator. So widespread indeed was this fame that Charles Ham, in his well-known chronicle of the epoch immediately preceding the phenomenal spread of the manual training school, termed Runkle "The Father of Manual Training."

Conspicuous among the educators who visited the Centennial was also Calvin Milton Woodward, soon to become the founder of the manual training high school. The *sobriquet*, Father of Manual Training, has been identified with his name, too, and more recently and perhaps more correctly. But undoubtedly Woodward never saw the Russian display at the Centennial and never knew its true nature and importance except through the eyes of Runkle. How fully Woodward had worked out his own views of manual training before the appearance of Runkle's famous monographs on manual education it is difficult to say; yet it is plain that, prior to them, handicraft instruction as a prominent feature of secondary education was not uppermost in Woodward's mind.



GOTTLIEB CONZELMAN

Perhaps it was the caprice of history that Runkle's school enterprise should perish on the rocks of begrudged finance long before the manual training school movement was well under way; and, on the other hand, that Woodward's manual training high school should realize the bold expectations with which it started on its adventure with the Russian System and should enjoy therein 35 years of usefulness.

At the mention of the bold expectations with which Woodward's school started on its career, my thoughts turn involuntarily and naturally to another historical happening of half a century ago. Apart from its antebellum aspect there was nothing immensely thrilling about the old Philibert Mansion, the setting of the scene. Long before the Seventies it had been stripped of every vestige of pretentiousness indicated by the name and was

WOOD-WORKING SHOP

MACHINE SHOP

TWO SHOPS IN THE ST. LOUIS MANUAL TRAINING SCHOOL.
(From Contemporaneous Prints.)

then a dilapidated old tenement, an encumbrance to the surrounding neighborhood. But it was a life-long whim of Woodward's to perpetuate this high-sounding name and to associate with it an abode of another sort—the abode of the spirit of one who laid there the first financial stone of an enduring monument in the field of secondary education. When this stone had been pronounced "well laid," Woodward confidently remarked: "I feel so sure that from this small beginning important consequences are to follow, that I almost envy you the satisfaction you will certainly feel in having contributed to its foundation."

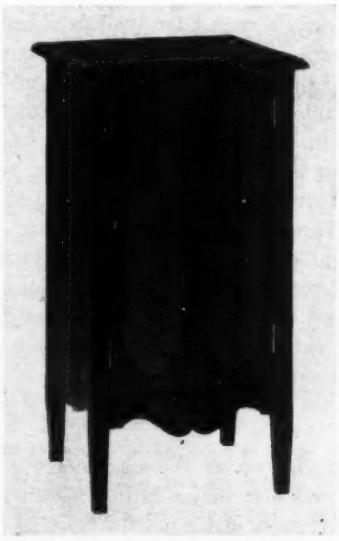
Now the man to whom Woodward addressed this curiously phrased remark is scarcely known to history; few educators ever looked upon his kindly face or even heard his old-fashioned German name. *Gottlieb Conzelman,* the first person in the world to contribute money for the development of manual training as an essential feature of secondary education, was born on May 5, 1809, near Stuttgart, in what was then the flourishing Kingdom of Wuertemburg, and died in St. Louis on April 24, 1884.

At the age of 4½ years, Gottlieb displayed so marked an aptitude for mental arithmetic and memory-gems that his parents considered him preordained for the teaching profession. With this notion in the foreground, they encouraged him to study Latin and other school studies then deemed necessary in such a vocation. Gottlieb, however, turned with aversion from these parental attempts, for it occurred to him that "schoolmasters were compelled to show abject submission to their superiors." This boy in whose character determined independence was a demonstrated factor left school at the age of 14, and was apprenticed to an upholsterer, with whom he remained until he was conscripted under the military laws of his country.

I suspect that the brightest day to chronicle in the early life of Conzelman would be July 1, 1830, for on that day he stepped upon the shores of America and conscription was no more. Other days there were, but these were forgotten soon; days when the tools seemed heavy, and days when the purse seemed light. Six years in the New York of the Thirties was time enough to breed a restless dissatisfaction that thrilled to the call of the "Erie" and the towns of the far frontier. After a circuitous canal and river trip Conzelman reached Columbus, Georgia, a flourishing town. Unfortunately the panic of 1837 wrought havoc with the furniture store he and a partner had opened there. So in 1840 he decided to sell his interest and to open a shop in St. Louis, a town with which he had been favorably impressed on his river trip, and one that, despite the panic and a cholera epidemic, had doubled in population within four years.

The beginnings of the modest fortune which Gottlieb Conzelman so liberally devoted to philanthropy were made in his little upholstering shop on the riverfront in St. Louis. In 1876 he agreed to contribute $1,000 towards fitting up a series of shops in the old Philibert Mansion (see illustrations). Moreover, the archives of Washington University show that during the next five years he gave the Pioneer Manual Training School, which was the outgrowth of the Philibert Mansion experiment with the Russian System, his valuable assistance and cordial interest. His gifts to the school during these years made up the splendid sum of $50,000, given to the cause of manual education.

Our memory trains are freighted with curious things as they travel back through the mists of time: Forgotten that Russian lure of The Fathers! Forgotten, too, that financial-stone laid fifty years ago!



MUSIC CABINET DESIGNED AND MADE BY A SENIOR STUDENT, MANUAL ARTS DEPARTMENT, MILWAUKEE STATE NORMAL SCHOOL, MILWAUKEE, WIS.

The Vocational School Administrator and the New Apprenticeship

S. Lewis Land, Chief, Home Study Division, National Trade Extension Bureau, Evansville, Ind.

One of the most encouraging tendencies in this country at the present time is an awakening on the part of building contractors and their organizations—national, state and local—to the fact that the really great problem confronting the building trades is the problem of apprenticeship.

Dual Responsibility

The training of apprentices is one of the paramount problems that the vocational school administrator as well as the employer of large numbers of mechanics is facing. The responsibility of promoting an apprenticeship program lies not alone with the vocational school nor with the building industry, but jointly with school and industry.

The building contractor has many problems to solve; one of the most important of which is that of an available supply of competent mechanics. Today, there is a distressing shortage in practically every trade in building construction. In many cities in some trades there are more masters than journeymen.

Shortage in the Building Trades

While our national population has been steadily increasing, the 128,000 journeymen plumbers of 1910 had shrunk to 103,000 in 1923. Statistics compiled in September, 1922, show the following percentages of shortages as compared with total requirements: Lathers, 57%; plasterers, 54%; masons, 50%; painters, 47%; sheet metal workers, 47%; bricklayers, 39%; steamfitters, 33%; cement finishers, 29%; plumbers, 28%; carpenters, 25%; electricians, 21%; and structural iron workers, 14%. This is a fair indication of what has occurred in other trades and industries.

How are we to replenish the building trades with the proper kind of skilled workmen? The safest answer as to where we are going to get more skilled workmen, is to make them. The sanest way to make them is through the new apprenticeship. The ideal toward which much effort is being directed—an adequate supply of young men in preparation for the work of the present and future generation—can be accomplished only through the cooperation of employers, employees, school authorities, and parents.

It is the responsibility of every building contractor to live up to the motto of the National Association of Master Plumbers, "At least one apprentice in every shop, and every apprentice in school." Many building contractors consider it their obligation to give to the industry at least one trained mechanic every four years.

How shall we select and train the right boy? If the building industry is to be elevated to the place it deserves, it must have a high type of craftsmen. The building industry needs men with keen minds, with trade skill, and with knowledge of the *why* as well as the *how*. Incoming workers of intelligence must be selected and given the proper training. To induce the right kind of boys into the trades the opportunities and possibilities must be made adequately attractive. Intelligent effort to draw boys of good mental caliber to the building industry is necessary and is being made along many lines, in some of the building trades.

Federal Board Conference

Realizing that there was an extraordinary interest in better organized training for apprentices in the building trades, and a genuine desire to cooperate in a comprehensive program, the Federal Board for Vocational Education in November, 1923, called a conference of representatives of national organizations representing both employer and employee groups. The following fundamental points were endorsed at this conference:

1. A thoroughly representative committee composed of all interests in the industry is essential to determine need and to supervise training. This committee includes representatives from the groups interested, including the following:
   a. Employers and contractors.
   b. Employees—labor.
   c. Manufacturers of building material.
   d. Public schools.
   e. Architects and engineers.
   f. Transportation agencies.
   g. Real estate.
2. Provision for part-time or evening schools to supplement the trade training of apprentices.
3. All-round training for apprentices is needed more than specialized training.
4. There is need for national associations to set up fundamental training standards for apprentice training and make information thereon available for instructional purposes. Local variations can be taken care of locally.
5. Cooperation with public schools is essential in promoting apprentice education. This cooperation can be realized in the following specific fields:
   a. Vocational guidance toward the building trades.
   b. Determination of mental and physical fitness for the job selected.
   c. Vocational training.
6. Provision for adequate incentives to induce boys to enter upon apprenticeship, such as,
   a. A guarantee through joint action of a group of employers of continuous employment through cooperation among contractors.
   b. A guarantee of opportunity to master the trade and become a craftsman.
   c. A guarantee of opportunity to secure training in technical phases of the trade—mathematics, trade drawing, science, etc.

d. The elimination, so far as possible, of intermittency of employment after apprenticeship.

7. Pre-employment training for employed apprentices or boys under contract for employment is recommended.

8. Emphasis should be placed upon training during dull seasons (for certain trades such as bricklaying) and part-time training (for such trades as plumbing) to follow up the initial training given in the pre-employment period.

9. The local representative committee should see to it that well-qualified instructors are provided.

10. The difference between the problems involved in training apprentices for the building trades and those involved in training for shop trades (such as printing) are recognized.

By glancing through these fundamental points it is easily seen that the keynote of the program of this representative group is cooperation. Employers, employees, school administrators, parents, and the public must cooperate if the program of apprenticeship is to be successful.

We have on the one hand, the needs of industry for a skilled personnel, and on the other the need of our young men for finding that work best suited to their individual characteristics, limitations and accomplishments. With the major trades properly organized for apprentice training, with the facilities of the vocational school, and with the cooperation of all interested parties, the boy is able to discover that which is best suited to his abilities.

The Four Pillars of Apprenticeship

It is the responsibility and opportunity of every progressive vocational school administrator to promote and develop this great modern institution called the "new apprenticeship." Any structure will only be as strong as its foundation piers. The four great foundation piers of the new apprenticeship are: (1) Opportunity to acquire thorough trade training and the necessary technical phases of the trade; (2) a guarantee of fairly continuous employment, (3) a guarantee of a fair wage; (4) a square deal.

Any successful system of apprenticeship will make provision for the training of young workers. In former days this training was given on the job by the master, but today, because of industrial specialization, it cannot be given on the job. A new training agency has been found in the vocational school.

The ideal conditions which successful vocational school administrators are establishing are briefly summarized as follows:

1. *A Local Apprenticeship Committee.* In many communities there is an Apprenticeship Committee composed of representatives of every interest; employee organizations, employers, schools, manufacturers and wholesalers, general public—everybody that is affected and everybody that can help. This committee is responsible locally for

a. Promotion of apprenticeship through education of the community;

b. Providing of adequate opportunities as listed below;

c. The drafting and enforcing of fair apprenticeship regulations;

d. Cooperation with local public school authorities to provide training.

2. *An Apprentice in Every Shop.* The slogan of one of the national building trades organizations is, "At least one apprentice in every shop." Every building contractor has an opportunity to bear his share of responsibility by employing and training at least one American boy constantly.

3. *Provision for Trade Training.* Opportunity is provided in many cities to acquire thorough trade training, in nearly all the building trades. The most attractive inducement that any employer can hold out to potential apprentices is to guarantee to them an opportunity to learn the whole trade. When it becomes necessary for an apprentice to ask repeatedly for a class of work to which he is entitled, but does not receive, or when he sees that he is treated as a helper or a necessary nuisance around the shop, he quits in discouragement and leaves the trade entirely, or goes to another employer who he knows will give him proper recognition. It is the responsibility and obligation of the master to give the boy a chance to learn the entire trade.

4. *Learning the Why and the How.* The apprentice today cannot learn on the job the technical knowledge required for success in the building industry. The best results can be obtained only through a combination of work on the job with instruction in arithmetic, science and drawing in the schoolroom. What do building contractors expect of the craftsmen who work for them? Too often they do not analyze the situation. Too often they do not consider that they are paying a man for what he knows as well as for what he does. It is true that he must possess skills. The best place to get those skills is on the job. But before a man can make the greatest use of the skill he possesses he must have a certain amount of knowledge. The best place to acquire this technical knowledge and an introduction to the necessary skills is in the vocational school.

Close cooperation between building contractors and the part-time evening school and vocational school is essential. Apprentices are sent to the part-time school for at least four hours a week to receive this related technical training in many places. A building contractor may ask, "Who is to reimburse me for paying my apprentice while attending the part-time school?" Hoover says, "A community must pay the cost of training skilled workmen or must pay the much higher cost of inefficient workmen." Is it not the customers, the consumers who pay the cost that is the result of poor quality of workmanship—the workmanship of incom-

petent journeymen? If this cost could be calculated, no doubt it would greatly exceed the cost of the training in the part-time school.

There can be no argument against the necessity of providing related trade training. Neither can it be denied that the apprentice can make more rapid strides in learning the trade if he is taught trade theory systematically. And the place to teach shop theory is in a vocational school under the guidance of competent instructors.

5. *Continuity of Employment.* To attract boys of good mental caliber into the trade, continuous employment must be guaranteed. This can easily be handled through the joint apprenticeship commission.

6. *Guarantee of a Fair Wage.* To attract desirable boys as apprentices in the building industry adequate wages must be paid. This can be based on the going journeymen's wage. The apprentice receives from twenty to 25 per cent of the journeymen's wages for the first six months of his apprenticeship, his wages advancing until he draws from sixty to 75 per cent of the going rate during the last six months of the learning period.

7. *A Square Deal.* The last incentive presented here, a square deal, in a way includes all the others. This means essentially cooperation between the employer, apprentice, parent, journeyman and the schools. The joint apprenticeship committee is responsible for the administration of this.

Modern employers recognize the need for giving apprentices a square deal, and a chance to advance, and as a result are discarding the ancient system of using the apprentice as a general all-round shop "flunky" for the first year or two. The apprentice is eager to try his hand at productive work. The necessity for giving the boy a chance to attend part-time school has already been emphasized and must not be overlooked in giving the boy the square deal he deserves.

Training Plans

Three plans for giving the technical related training to apprentices have proven successful.

1. *Part-time Classes.* Part-time resident classes in the local part-time school have been provided in many cities. In cities of more than 50,000 population the demand is sufficient to justify the establishment of resident classes in most of the building trades. Whenever it is possible the situation can best be taken care of in this way.

2. *Itinerant Teacher Plan.* Towns and cities too small to provide suitable full-time instruction in the building trades may take care of the situation through the itinerant teacher plan. This plan has worked out very successfully in Wisconsin. The plan has been tried out in two of the building trades—plumbing, and painting and decorating. The plan has proven so successful that arrangements are being made for employing another itinerant plumbing instructor. The instructor holds classes in four cities each week. Day classes are conducted for apprentices, and evening classes are provided for the study of advanced problems for journeymen. The plan has worked out very satisfactorily, and is recommended for towns and cities of population of 25,000 to 50,000, within reasonable reach of each other.

3. *Correspondence Instruction.* More than half the apprentices in the building trades in this country are in towns and cities too small to get instruction by either of the two plans which have been outlined. For apprentice plumbers a home-study course has been prepared by the apprenticeship service department of the National Trade Extension Bureau. This course follows the standardized course of training which has been prepared for resident schools.

It is written in simple interesting language, with many illustrations. It is divided into short lesson units. Each lesson is planned to tell the facts about some particular side of plumbing. Each lesson is accompanied by a study manual which tells exactly what to do.

Apprentices in many of the other building trades take advantage of International Correspondence School courses, and correspondence courses offered by university extension divisions.

While it is believed that the responsibility of providing instruction to apprentices lies with the public school, until the state assumes this responsibility, employer organizations and private enterprises will continue to provide instruction at the expense of the boy.

4. *The Indenture.* Apprentices in the building trades have their agreements in writing in the state of Wisconsin. All learners in a trade who are minors enter into written agreement. This agreement is in triplicate—one copy for the boy, one copy for the employer, and one copy is filed with the State Industrial Commission. The agreement is signed by the apprentice, his parents, the employer and the chairman of the Industrial Commission. The agreement contains the date of beginning apprenticeship, the period of duration of apprenticeship, the processes or parts of the trade to be taught and practiced, and the amount of wages to be paid.

This same system may be adapted to any community with the local apprenticeship committee, taking the place of the industrial commission.

The question might be asked: Why should boys learning a trade be indentured? A boy learning the trade with no special agreement of apprenticeship with his employer is under no obligation to complete his term of training; nor is the employer under any obligation to furnish the diversified type of work so necessary to develop the all-round mechanic. Rarely does the boy become an all-round mechanic under such loose agreements in our highly specialized industrial life. The apprentice works for a year or two and then, consider-

ing himself quite capable of holding his own as a semi-skilled workman, leaves his trade half trained, at an increase of perhaps a few cents an hour offered in another shop. The result has been a gradual reduction in the number of skilled journeymen.

On the other hand an indentured apprentice is under specific obligation to complete his term of apprenticeship. He cannot jump from job to job as he finds them. Should he violate the agreement, the apprenticeship committee would use every effort to induce him to return unless there should be just cause of his leaving.

An attempt has been made to suggest the essentials in a comprehensive program of apprenticeship for the building trades, and to indicate the responsibilities of those whose obligation it is to promote it. To initiate, develop and promote this great institution of the "new apprenticeship" is the responsibility and privilege of the vocational school administrator.

The Automobile Engine Oiling System

Ray F. Kuns

(Conclusion)

Vane Type Pump.—The vane and impeller type of pump is illustrated in Figs. 15, 16 and 17. It will be noted that the circular impeller is set to one side of the pump body. The impeller runs almost in touch with one side of the pump body. The impeller is not eccentric

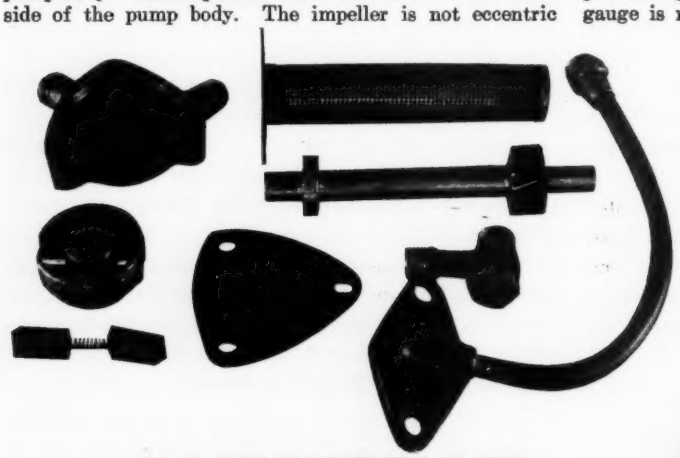


FIG. 15. PART OF A VANE TYPE OIL PUMP.

but the vanes have an eccentric motion as they are turned by the impeller, since the spring causes them to remain in contact with the sides of the pump body at all times. The result is that oil is drawn in after one of the vanes and caught and carried on ahead of the next vane. As the space between the impeller and the pump body walls grows less the vane slides into the impeller but the oil is forced out through the lines of the engine.

Oil Feed Gauges.—Oil gauges are of two classes. Gauges used to indicate the amount of oil in the pump and gauges used to indicate the pressure or flow of the oil. In the latter class there are two divisions. The first of these and the oldest used in automobile work is the sight feed. Oil from the pump is run through a tube to the dash or instrument board and then fed back through another line to the engine. This type is obsolete for passenger car use. An example of it appears at the center of Fig. 18. This type is unsightly and likely to cause trouble from leakage and glass breakage.

Conventional practice indicates the use of the oil pressure gauge for instrument board mounting. This gauge is neat and not subject to the annoyances of the sight feed. It will allow oil to drip in the passenger compartment if the line leading to it is not tight, but no pressure comes on the glass and it seldom gathers any oil on the outside of the case. A properly mounted gauge is not operated by oil but by the column of air in the pipe ahead of the gauge. If the air is lost due to a slight leak, the operation is not affected in any manner. Pressure gauges are marked in pounds or may be marked in a fashion which gives a comparative reading only. Car manufacturers fit proper gauges to their cars and give instruction for the amount of pressure which should be maintained.

If some part of an engine oiling system is clogged, the pressure indicated on the gauge will rise. This does not necessarily mean

FIG. 17. VANE TYPE PUMP ASSEMBLED WITH GEAR DRIVE INDICATED.

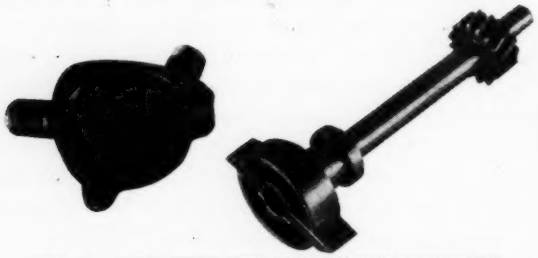


FIG. 16. VANE TYPE PUMP PARTIALLY ASSEMBLED.

A B C

FIG. 18. OIL PRESSURE GAUGES AND SIGHT FEED GAUGE.
A. Low Pressure; B. Sight Pressure; C. High Pressure.

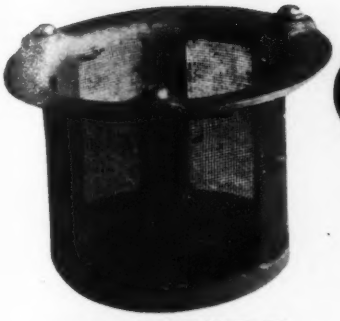


FIG. 19. OIL STRAINER IN BAD CONDITION.

FIG. 20. OIL STRAINER REPAIRED.

trouble, but on the other hand, it need not be taken to mean that the system is working satisfactorily. Cold oil runs a higher pressure. New oil runs a high pressure. Water frozen in the oil line runs a high pressure. Hot oil shows a low pressure. Thin and diluted oil shows a low pressure. A broken oil line or failure of some of the plugs sometimes used in crankshafts allows the pressure to drop down. Very low or excessively high pressure should occasion suspicion and, if it can not be accounted for by means of the known normal conditions, an investigation should be made.

Oil Strainers.—Most manufacturers place at least one strainer in the oiling system. Neglect of the strainer may be serious. Sometimes the strainer becomes clogged with sediment and muck. No oil can pass. The oiling system is starved and damage results. Or an oil screen may corrode and fall away. This allows foreign matter to get into the lines, clog them, and thus cause failure. One type of oil strainer appears in Fig. 15. Another appears in Fig. 20. A strainer which has seen much service and failed is shown in Fig. 19. Much sediment and many small pieces of foreign matter had found their way into the inside of the cup. This screen was repaired, as shown in Fig. 20, by soldering new bronze gauze or netting in place.

Care of the lubricating system pays higher dividends than any other one point where care may be taken.

The Storage Battery for Automobiles

Ray F. Kuns, Cincinnati, O.

Storage Battery Duties.—The convenience and reliability of fine motor cars depends to no slight extent upon the lead storage batteries which are universally used. The battery is usually out of sight and sometimes sadly neglected. It is depended on, however, to furnish electrical current to operate the starting motor and the ignition system in order that the engine may be started. When the engine is turning under its own power, it picks up speed until the generator is cut into connection with the battery which is then recharged. Any electrical devices in use when the car is standing with the engine dead, depend upon the battery to supply the needed energy in the form of electrical current. When the engine is operating and the car is in service, the battery may be called on to furnish the current or the generator may furnish it. However, it should be remembered that except for the battery, it would hardly be practical to use a generator to furnish lights for running. The battery takes any excess current and keeps the light bulbs and other units from being damaged. The battery is the heart of the electrical system of the automobile and pumps its "juice" into all the "arteries" or circuits of the system, when and where needed.

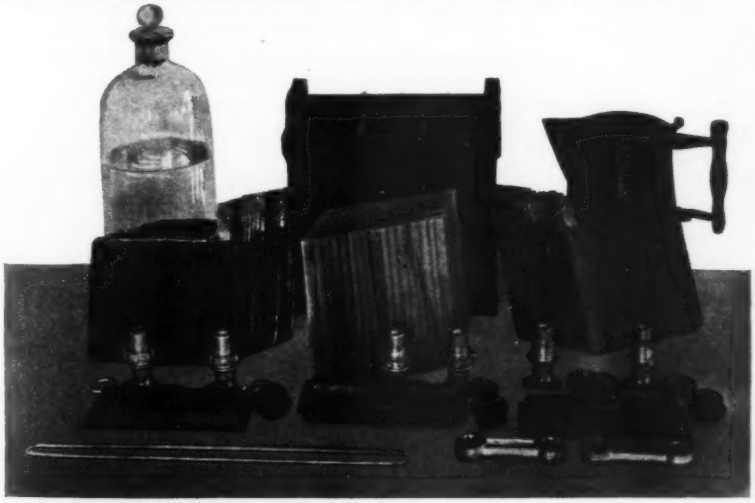


FIG. 1. PARTS NECESSARY FOR THE CONSTRUCTION OF A SIX VOLT ELEVEN-PLATE LEAD STORAGE BATTERY.
These are: Positive Plates, Separators, Negative Plates, Case, Covers, Post Plate Straps, Gaskets, Lock Nuts, Vent Caps, Cell Connectors, Lead Burning Strips, Pitch and Electrolyte.

Battery Parts, the Case.—Parts necessary for the construction of a lead storage battery are illustrated in Fig. 1. Formerly it was universal practice to use wood cases and individual cell jars. The case illustrated is hard rubber and has cell compartments molded as an integral part of the case. The case is provided with ribs in the bottom of the cell compartments, on which the plates rest when the element is in position. There are many makes of cases, the chief difference being the method of attaching handles, molding reenforcing ribs, and similar minor points of design. Acid does not attack and eat away the rubber and unless accidentally broken, the life of the case is indefinite. Wood cases require frequent painting and even then the acid gets through and destroys the wood fibre.

Plates.—Plates are the most expensive parts of the battery. They are subject to constant chemical changes and wear. As they are used, the active material is constantly undergoing this chemical change, and small particles shed from the surfaces drop into the bottom of the cell compartment or cell jar.[1] The active material of the plates consist of lead oxides mixed with electrolyte and pasted into the frame of the plate which is a lead casting called a plate grid.

Plates are assembled and burned or welded into groups, designated the negative group or the positive group. One more plate is always found in the negative than in the positive group. Fig. 2 illustrates the use of the welding rack and the welding of the plates onto the

[1]See page 290, Kuns' Automotive Trade Training.

plate strap post to form a group. Fig 3 shows the method of fitting the two groups together, which is the first step in assembling the element. An element is the assembly of parts, plates and separators, which is built up for each cell of a battery.

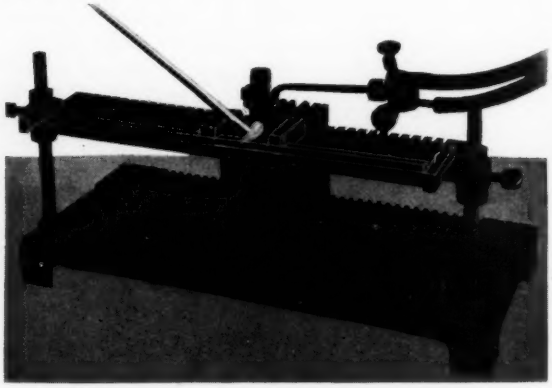


FIG. 2. BURNING PLATES INTO GROUPS.

Separators.—Separators may be wood or they may be of a special composition made up for the purpose. Some manufacturers use a combination of wood and rubber for separators. One large manufacturer uses a separator formed by incorporating many cotton strands or threads in a rubber sheet. Irrespective of the material used, the separator must be porous, yet it must not under any circumstances have openings of perceptible size entirely through it. While the pores allow of the circulation of the electrolyte, the separator still acts as an insulator. Except for the electrical insulating properties of the separators, the battery would not hold a charge. Separators

FIG. 3. ASSEMBLING THE NEGATIVE AND POSITIVE PLATE GROUPS FOR ONE CELL.

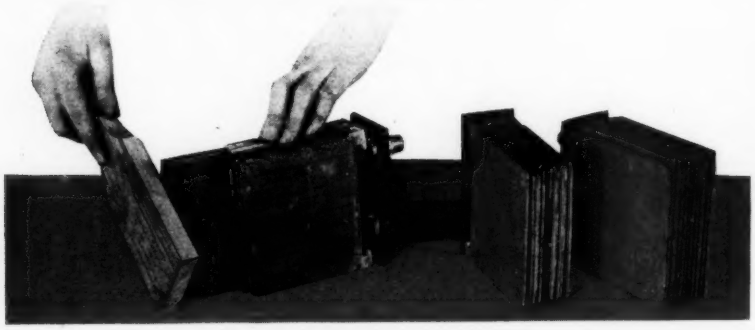


FIG. 6. INSERTING SEPARATORS.

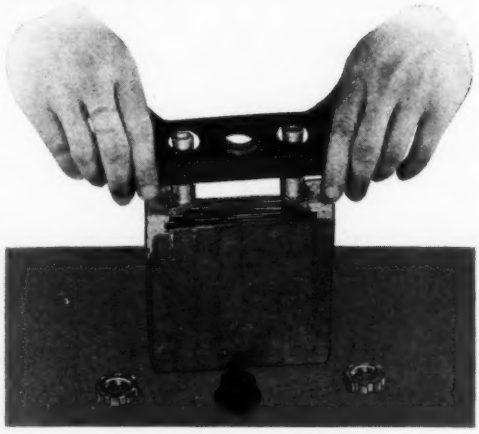


FIG. 4. INSTALLING A COVER.

for a six-volt, eleven-plate battery appear with other parts in Fig. 1.

Cell Covers.—Cell covers are attached to the group posts by a number of methods. One of the most satisfactory is illustrated in Figs. 1 to 6. The post has threads cast on it and a lead nut is cast to screw onto it. Rubber gaskets are placed on the post shoulder, the cell cover is assembled, and then the lead nut is screwed down snug. This locks the groups together and the element is completed with the insertion of the separators as shown in Fig. 6.

Elements.—In Fig. 7 the elements are all assembled and ready for placing in the cell compartments of the case. When properly designed and assembled, the element is a snug fit in the cell compartment. If this is not the case, the parts are loose and the vibration of the car will wear and destroy separators and plates. The elements are assembled in the case so that, when the cell connectors are placed in position, the groups are in series, that is, one negative group connects to a positive group in the center cell, and the negative group of the center cell connects to the positive group of the other end cell. In Fig. 7 the elements are placed in proper position for assembling. Placing the elements in the case as illustrated in Fig. 8, leaves the battery ready for sealing.

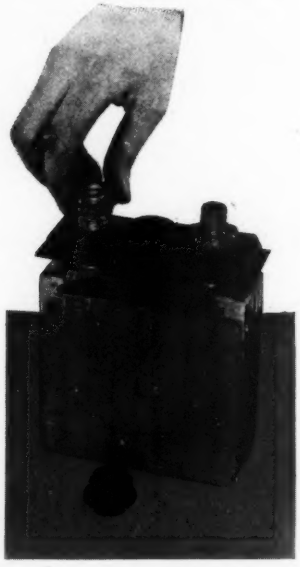


FIG. 5. LOCKING A COVER TO POSTS.

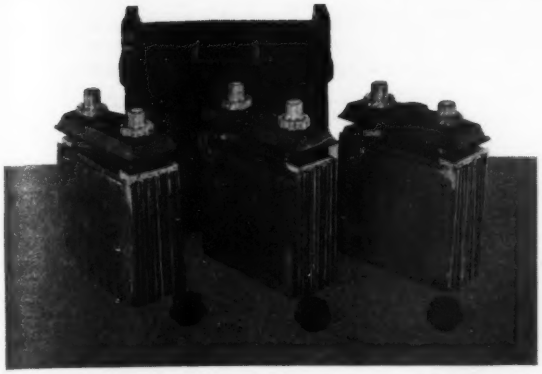


FIG. 7. ELEMENT READY FOR THE CELL COMPARTMENT.

Sealing.—Sealing a battery means running battery sealing compound which is a pitch-like preparation, around the cell covers, and joining them in a sealed fit to the edges of the cell jars or cell compartments. The sealing serves two purposes. The prime one is the preventing of any of the electrolyte from getting out of the cell jar. At the same time foreign substances are prevented from getting into the battery and setting up chemical actions therein, which would shorten the life of the battery. Sealing compound must be handled carefully since it can only be used when melted. Considerable heat is required for melting it, and burns of a serious kind result if it strikes the hands of the operator when melted. Sealing compound cools rather quickly and hardens as it cools. It does not become brittle unless very cold. It is acid-resisting. In some types of construction, sealing compound is used to seal the post to cover as well as cover to jar or case. Where this method is used the cover and post are especially designed to facilitate the job.

FIG. 8. PLACING THE ELEMENTS IN THE CELL COMPARTMENTS OF THE CASE.

The Industrial Arts Program as it Relates to Vocation-Finding in a City School System[1]

Supt. Harry Wilson, Berkeley, Calif.

In the statement, "Happy is the man who has found his work," we have one of the fundamental truths of life. Man's work is truly a main key to the measure of happiness he enjoys in life.

After giving the best possible attention to health and character, there is no other service the school can render the pupil that is equal in importance to guiding him into the discovery of what he should do. Not only is this discovery important to the individual himself, but it is equally important to the progress and development of society.

Important as it is that each should be launched aright in his vocation, it is surprising to note the large number of people who are unhappy and unprofitable alike to themselves and to society. This is in large part owing to the fact that they did not succeed in discovering the vocations through which they should attempt to serve society and promote their own development.

Factors Influencing Vocational Choice

So many factors operate to influence vocational choice that each individual is in danger of being unduly influenced by factors of minor importance. The job which is easy to get, or which is near at hand, is often the work into which a person enters without adequate consideration of whether he is adapted for it, or whether it affords worth-while opportunities to him. Oftentimes an individual imitates someone else whom he admires without having canvassed whether he has the assets to enter into a similar vocation or not.

So important is right vocational discovery to the welfare of the individual and society that the school should leave nothing undone which it may do to guide each child aright vocationally. Not only should industrial arts courses seek to provide opportunities affording vocational guidance, but other departments have a heavy responsibility in this relation also. Every department of the school, in fact, is responsible, but this is particularly true of the departments of commerce, art, music, science, journalism, and the like. Each of these departments has large opportunities to reveal the student to himself, and likewise to familiarize him with the opportunities open to one of his talents and abilities in an occupational way.

It is evident, of course, that there should be in every school system a general policy, a common point of view, guiding all departments of each school in their efforts to aid pupils to discover themselves vocationally. It is just as important that schools should work to prevent wrong decisions vocationally as it is that they should work to bring to bear those influences which lead to right vocational decisions. A pupil may make a wrong decision as to the work which he should undertake to do, resulting in his doing something less than the best he could do, or in trying to do something beyond what he can do, or in choosing an occupation that is overcrowded in the region of his probable work. In light of the pupil's ability and of the schools' knowledge of the opportunities for work, the pupil should be guided away from wrong vocational steps and into the special work for which he has ability and equipment.

[1]An address before the Department of Vocational Education, N. E. A., Washington, D. C., February 24, 1926.

From the foregoing, it is clear that the industrial arts department carries just one portion of the school's vocational guidance program. This department must execute with the greatest care the general vocational guidance policy of the school with reference to all students who come under its influence, without reference to those students who should enter a vocation related to the industrial arts courses. The industrial arts instructor has a large responsibility. He must see that each chooses some trade in which he has *ability*. The experienced industrial arts teacher knows well that *choice* and *ability* do not always go together. Nor do *interest* and *ability* always go together.

The Right Choice of a Trade

This actual case in Berkeley will illustrate. Forty boys sought to get into the class of Mr. Young, an electrical instructor. Half of these are weeded out through interviews, since he must not have over 20 students. The 20 are fortunate to get into his class, because he knows his trade, he has a good educational background, a keen penetration of boy nature, a knowledge of what the employers of the region want, and the important knowledge of the existing opportunities in the electrical trade. All the boys have the interest to begin with. At the beginning, each boy is given an opportunity to explore the many branches of the field. Since the whole program is predicated on individual study, he soon finds that six of the twenty take readily to all branches of the trade. Eight more show ability to do one or more things connected with the trade, four show little ability in any branch, and two lose interest when they come into contact with the trade. It could be assumed that the first six would make all-around electricians, but Mr. Young was not quite through with them. One of the six showed that he could not meet the public. He shrank from contact with his fellows. Because of this and other traits, he would not make an all-around electrician. He did show a decided interest in battery work. He could do this in the seclusion of the shop. The result of this knowledge and penetration on the part of Mr. Young in the case of this boy, can be seen by a visit to the vocational department of the high school where you will find in him a battery man equal to any in the trade, happy in his work and in the knowledge that he has been promised a good job at the end of the year. The five of the first six are learning the whole trade. The eight are learning a special branch of the trade. But what of the four who have great interest in this trade, interest in no other, and do not have ability ever to become tradesmen? In Mr. Young's own words, "They are happy if they are chasing material and holding the ladder for the electrician. They should make the best ladder holders that the trade can secure." Of the two who have lost interest, one is being found through the same process in exploring the woodworking course. The other will probably join that irreducible minimum who make the twelve per cent of unskilled labor, but even he will be happier from his experience and perhaps the finding of an avocation. The outcome with these twenty boys illustrates that the instructor has a big job after the first "choice" is made and the first "interest" proclaimed.

Another proof of this was emphatic. A large industry in the Bay Region gave out the information that they interviewed 300 applicants to secure 22 boys. Ten other leading industries told me that the chief objection to taking school boys was the turnover due to wrong selection. But through the junior placement bureau and through Mr. Young's own efforts, we placed *all* of the students who had been through Mr. Young's class and had finished the vocational course. Since nearly one-third of all the boys must eventually find their way into the skilled trades, those charged with carrying out the industrial arts program, even though they are not always nearly so successful as in the case described, are taking care of a big need in the guidance program of the city school system.

The Function of the Industrial Arts

It is pertinent to ask, how does the industrial arts program function in affecting (1) the *choice* of a job, (2) in making the student more capable of filling it, and (3) in finally placing him? We cannot justify a vocational finding program by showing only that we eliminate some students who expect to choose a vocation beyond their ability. The student who does not make all passing grades in chemistry is eliminated from being a chemist, but that does not go far in finding his right place. The student who goes from one course to the other and fails is a "misfit," but in the industrial department there is no misfit. "If he cannot become an all-around electrician, he can become the best ladder holder."

What does the industrial arts teacher do to "find" the student who apparently has no interest?

A girl came into Mrs. Meece's class in sewing, a class of girls who would all have to work. She had been in several classes and had been only a source of annoyance and trouble. Her first remark was, "I have to come here but I don't have to work." Mrs Meece answered her, with a smile, "Very well, you may be interested in watching us." After two or three days, the class was having a lesson in draperies. The girl became interested, forgot her sullenness and offered some suggestions. The interest was nurtured by Mrs. Meece and it grew. As the interest grew, evidences of marked ability developed as time went on, and finally this ability was brought to the attention of a large department store. The girl was given a short course in a trade school and now she is head of the drapery department in a large Berkeley store. Because we are talking about "finding" programs, the big story about the girl, the change in viewpoint, the development of character—is left untold. That this case is not unusual is evidenced by the fact that there is now a waiting list of employers for girls trained in Mrs. Meece's class.

Sometimes the wrong interest or ambition may be a more difficult problem than no interest. It might be expected that if a student who thought he wanted to be a carpenter and went into the woodworking class, would merely be eliminated if he showed no interest in that work. But this is not true for two reasons. In the first place, he is not secluded in a woodwork shop, but he is able to see machine shop work, forging, auto repair, electrical work, concrete work, printing, sheet metal, and mechanical drawing going on in surrounding shops from which he is divided by a low partition. In the second place, the instructor forms the habit of looking for traits and abilities that fit him for other work. Earl Williams of the Burbank shop, gives this illustration: "Peterson was a big overgrown boy and school was more of a joke to him until he became interested in the shops. He had in mind the carpentry trade and consequently had plenty of woodwork, mechanical drawing and electricity, all of which became obnoxious to him. I discovered that in his mechanical drawing he neglected his regular work to do freehand printing and post designing.

"Because of his home environment he found it necessary to go to work. We had a long talk about trades, and I advised him to take up printing, giving him the unusual advantages of the trade. He has now served his apprenticeship and is valued very highly in the shop in which he works. He frequently shows me samples of his work with no small amount of pride."

Williams is not only an industrial arts teacher, he is, to his students, a counsellor and a friend.

Another illustration of a similar change in interests, but taking place in the part-time school. "Margaret

worked in a factory at a wage of $16.50 a week. Her work was of a routine nature that afforded no opportunity for promotion. When counselled regarding her placement in classes, she was sure she wanted to take a commercial course. During the six weeks that she took commercial work, where she made little progress, she came in contact with the teacher of sewing. She requested that she be allowed to go into her class. She showed ability in this work. Her opportunity came when she was placed in a tailor shop. She is now happy in doing what she is best adapted to do. Her employer is satisfied with her work and from time to time makes reports of her favorable progress."

Mr. Dunkum gives another illustration of the more complicated finding problems, the problem of the student who has both interest in the trade and ability to do the job, but has dislike for the actual doing of the work. "Robert entered our shops with a mechanical ability unusual for his age. He tried out all the shops and although he did excellent work, he had a dislike for the actual contact with the work. In making plans for his projects, he showed that he had a particular interest in mechanical drawing. After trying the different drawing fields, he finally selected architectural drawing as his preference. He is now in the vocational school, doing unusual work in architectural drawing. He definitely knows that he wants to make architecture his life work."

The cases given above are typical illustrations of some of the work of the industrial staff beyond the mere finding of a pupil's general interest and ability. A great majority of the cases gathered from the staff, read almost exactly like this one from Mr. Frick: "Robert, in his seventh-year course had sheet metal shop, in his eighth-year course forging and plumbing. He elected plumbing in the ninth year by reason of his experience in the eighth year. At the close of school, he secured a job as an apprentice plumber with a local plumbing firm and his employer reports that he is making good."

By substituting various other trades for sheet metal, forging and plumbing, scores of other cases given to me would be exactly like Robert's. Then certainly the industrial arts program is functioning in finding the vocation, in making the boy more capable for it, and in eventually placing him where he belongs.

Methods of Attaining the Finding Objective

We have discussed the place of the industrial arts staff in the vocational guidance program and have given illustrations of how it has functioned in a great many cases. Next, we will undertake to summarize the methods by which the "finding" objective is reached, and, as before, illustrate the description with cases from the system.

We find the following under "general procedure" in the Berkeley Course of Study for Prevocational Industrial Education:

"We have five important methods for assisting the youth in choosing or rejecting the various vocations:

1. Participation under controlled conditions as nearly typical of the actual working conditions as possible.
2. Information in the form of reading material on conditions of work and opportunities for promotion in the various vocations.
3. Description of technical operations in industrial production in technical books and magazines.
4. Observation of production through supervised visits to places of employment, factories, shops, scenes of building operations, and ship yards.
5. Correlation of instruction between teachers of academic subjects such as English, science and mathematics and the teachers of industrial subjects.

In carrying on this finding program, the prevocational industrial teacher is charged with five important responsibilities.

1. To see that his students get that "Participation under controlled conditions" spoken of in the course of study.

In Berkeley there are nine trades represented in the shops of the junior high schools, six in the part-time high school shops and five in the vocational trade classes in the senior high school.

Influence of Try-Out Course in Trade Selection

The most obvious objection to the tryout course is that only a few occupations are represented. In commenting on this objection, the manager of one of our large industries said, "There are one to ten elements in numbers, but by making combinations out of these elements, they will run into millions. In the same manner, jobs are a combination of a few elements. If the basic industries are represented in your shops, that is sufficient." By grouping jobs which have similar material, or in a similar location, or with a similar machine, much time can be saved. The actual working of this exploration of trades can best be illustrated by giving cases cited by the instructors.

Quoting Mr. Dunkum of Willard School again, "It is our aim to present the work representing the different trades in such a manner that the student will be able to perform and observe the work being done in the more advanced levels of the trade in which he is interested, and also be able to observe something of the nature of other trades represented in the shop. This enables the student to see something of the nature of various trades, which helps him in future selections." These are a few of the cases in which boys have selected their life work. "Carl Roberts came into the shops and elected to take up woodwork. He became interested in watching other boys lay out sheet metal jobs. He changed his course to sheet metal, followed that through and is now working in the trade at Macauley's foundry." From all the other instructors come numerous cases such as "Liked fine machine work—finally became a dentist"; "Was not very much interested until he came to the auto shop, liked that and is now working in a garage"; "Liked printing —not much ability—but now making good as a pressman," and so on to the extent of a hundred cases gathered in brief talks during a day.

There is much more, however, to the problem, than the mere finding of the choice of the student by tryout courses. Flexible transfers from one shop to the other mean "flexible teachers, flexible lessons and even flexible standards." This means sympathetic, analytic teachers who can discern traits and skills and who can predict whether the pupil is likely to succeed in the work he is attempting. For instance, in the wood worker, "The ability to set and to manipulate a plane so as to produce a plane surface, the nicety of touch and the precision of the eye necessary to produce a plane surface, the steadiness of purpose to perform all these acts faithfully, and with the aesthetic sense or the sense of good workmanship essential to a desire to produce a plane surface."

Responsibilities of the Instructor in Vocational Guidance

Each shop teacher has ample time to try out the boy, and is impressed with the necessity of the boy making a success in any class to which he may be assigned, but as Dr. Franklin Keller says, "No creaking of administrative machinery, or traditional aversion to change, makes difficult the mechanical process in bringing about a change."

Every job and every lesson contains vocational guidance factors until the student is so far along that the problem is only to train for efficiency. This is one of the things uppermost in the minds of the instructors.

Mr. Wagenet of the auto shop, in grouping his students, watches them on the job. He has constantly in mind "Does he go at his work properly," "Is he accurate," "Can he follow directions," "Is he alert, neat, orderly,

economic," "Does he appreciate time, a job well done?" He can judge his student better than any counsellor, supervisor or teacher, because he sees him working on individual projects and with his fellows every day. He learns to know him as an individual and not as one of a group.

2. This brings us to his second responsibility. The instructor is the most effective vocational counsellor. He may get his own inspiration and many of his facts from others, but as far as the boy is concerned, all vocational guidance factors center in him. That this is true will be seen in nearly every case already given and given hereafter. "After having a long talk with him about all the trades," says one, "I advised him to take up printing." Another says, "He planned to drop out of school on account of finances. I found that the job he expected to take was one with no opportunity for advancement. On my advice he took another job where he could learn the business as a whole—and also have a chance to take work in the high school shops."

The effective vocational counsellor is not the one who looks up a boy's record and advises him, but the one who is in contact with the boy from job to job and from day to day. Boys like their shop teachers and he obtains their confidence. He is their friend. Recall the illustrations given: "He frequently comes to see me and shows me samples of his work with a great deal of pride," "He reports that he likes the job fine." These occur time and time again in the long list of cases. The supervisor may keep the guidance and counselling efficient, but he cannot replace the teacher as a counsellor. He has opportunities with every job and especially with every possibility of placement. There are opportunities every day for lessons on how to seek a job, and how to make a good impression on the employer. For instance, Mr. Haller learns that a certain employer in Berkeley has a sort of "slide rule mania." When a boy is selected for that industry, he gives him some intensive training in the use of the slide rule. We have some good boys making progress in this particular industry who would not have secured the job if it had not been for this little extra training. Little pieces of advice given at the moment, associated with a particular job will stick. The accumulation of advice and instructions in an interview or lecture is soon forgotten.

3. The knowledge that one must possess to do this counselling suggests the third responsibility, research and gathering of guidance data. There is no time in the guidance program for talking about "going into life." The instructor can make the work so real that "school" and "life" is an orderly procession instead of being separated by that great gulf lightly spoken of as "transition." To do this, he must know industry about him and he must know much of it first hand. He must know its policies, its opportunities for promotion, whether or not it develops leadership, the different kinds of labor it can absorb, its health conditions, its mechanical developments—everything that will have its influence on the training that is given.

In Berkeley, this knowledge is secured (a) through visits to industry by the teacher where he observes what is going on. In many cases, he stands high among his fellow craftsmen, as in the case of Mr. Marker of Edison School, who is secretary of the Printers' Craftsman's Club, and is welcome always in any printing plant. One-half day every week the head of the industrial department teaches the classes of one of the teachers, while he goes to some industrial plant and reports back any new information or ideas to the department. On some trips, both the teacher and students go through some industry. It is the trained eye of the instructor, though, who must see and interpret to the student.

(b) Through trade journals, papers and magazines placed regularly in the hands of teachers and made available to students.

(c) Through trained coordinators who are constantly in touch with industry and who secure much information that could not be gained by occasional visits.

(d) Through the guidance and placement bureau which gives at any time an accurate statement of the opportunity for employment in the Bay Region.

A series of foremanship conferences is to be added to these sources where the school, by giving a wanted service, gets the confidence of industry which will reciprocate with stronger cooperation.

Besides this industrial information, he must know about home conditions, the physical condition of the student, and his other interests and school activities. In many cases, he must even make his own tests to determine such things as manual dexterity, motor coordination, steadiness and precision. He knows what the boy has been, and what he is, and he tries to judge from this, what he is going to be.

4. By these methods of exploration and counsel and by bringing the boy into intimate contact with industry itself, he does much to determine his choice. But the test of his success, the proof that his guidance is functioning, is eventual placement. Guidance, trade training, placement, all follow in a procession and cannot be separated. It is true that the main responsibility of placement is not on the trade teacher, but he does not escape his share of the responsibility. Many of his students cannot go on to high school. He must find places for them before they have finished the prevocational course. His knowledge of industry, and his cooperation with industry in gathering his information and data, has made him particularly fitted to aid in the placement work. Great numbers of cases read like this one. "He took two years of woodwork, made several nice projects and seemed to be much interested. He had to drop out of school because of finances. We secured him a job with the University Apparatus Company which enabled him to work in electric and auto shops at the high school. His all-around shop experience makes him invaluable and he is in charge whenever the superintendent is away."

This placement, too, makes the guidance program much easier as far as the instructor is concerned. The boy has more respect for the counsel and advice of an instructor who is able to place him in industry, and guidance, on the other hand, obviously makes placement easier. The illustrations in the beginning of this paper explain the system of selection which Mr. Young uses, and shows what the system can do as an aid to placement. Industry demands these boys because it knows that they can do one thing well. Furthermore, placement is valuable to the whole school system. It is the meeting place of the widely different fields of education and business.

Establishing Relationship With Employers

To the placement bureau is left the responsibility of establishing relationships with many employers. A great many methods are used. Talks are made at meetings of various industrial and business organizations, chambers of commerce, service clubs, and personnel associations. Again the foremanship conference is a valuable aid in forming contacts which will be valuable in the placement work. The instructor himself is especially valuable in the special cases. He must know the problems of placement before he can give effective guidance.

For example, two boys of a race that is never represented in a certain trade ask to take up a study of that trade. He knows the placement problem and steers them away from this course and prevents three or four years of wasted time.

5. The interest in placement is probably most valuable in the "follow-up" of the boys by all members of the industrial staff. In all the cases given, you have noticed that the instructor knows what his boys are doing, where they are working, how they like their jobs, and the essential facts about their work. The interest is due to some extent to job pride, but it is mainly in the boy. He is working all the time to give encouragement and aid which will lead him to advancement. He gets the habit of following up the boy, and even though he is not working in one of the trades taught, the follow-up is made just the same. An example has come to my attention. A boy went to work as a delivery boy for a cleaning establishment. The instructor knew that he was capable and bright, and in talks with him gave him pointers as to how he could advance on the job. He gave him suggestions as to how he could meet the customers in calling and delivering. He asked the employer to note any change in the amount of business in the run the boy was on. As a result of his alert and courteous manner, he increased the business for the firm, and, as a consequence, he received a raise in salary. That the job was not one that would naturally result from a course in the industrial department is all the more evidence of the staff's interest in developing vocational efficiency.

The placement and follow-up activities do much to prevent the haphazard manner in which boys and girls go after jobs. A guidance program will not function very efficiently if a job is secured in the manner a recent questionnaire indicated. "I walked down the street until I saw a sign, and went in." "I got the job through a friend"; "I just walked into a place and asked for a job"; "I saw it in a newspaper." Over one-third of the advertisements which the boys and girls put into advertising columns for work read: "Will do anything," which, to the employer, means nothing.

Making a Guidance Program Function

Then in a city school system, in order to make the guidance program function properly, the placement bureau or the director must discover, classify and keep efficient records of jobs, must make full use of the records of the pupils compiled by teachers and records of working conditions resulting from the knowledge gained through coordinating activities. He must make the placement an integral part of school activities.

The guidance work must control the placement. The industrial department then finds itself constantly facing the problems of tryout, counsel, research, follow-up and placement and it must meet and solve all of these problems in order to do a complete job in vocation finding.

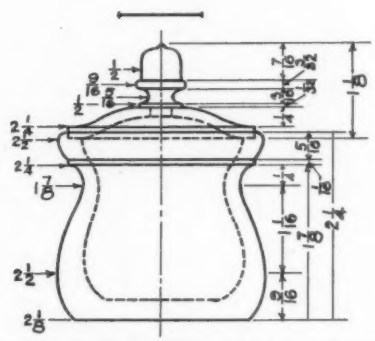
In a discussion of the value of guidance and selection, the place of the industrial arts program in the field of guidance, the evidence of the success of the program and the means of carrying on the work, there is no intent to convey the impression that this is the only, or the principal purpose of the industrial department of the city school system. If a different viewpoint had been desired, we might have written of the program in relation to worthy home membership, good citizenship or any other aim of education. The industrial arts program is not alone vocational education—it is education.

In bringing out the various influences of the school which guide the pupil in his vocational choice, those in charge of teaching, counselling, and placement should preserve an open-minded attitude and should likewise influence the pupil to a similar attitude. This is owing to the fact that during the years that the pupil is in school and beyond, one of his outstanding characteristics is growth and development with resulting change. The pupil changes not merely in weight and intellectual ability, but likewise in life purposes and, therefore, vocationally, perhaps. Studies in this field record marked shifts in the vocational intentions of pupils. It is quite common for a pupil to have had a number of vocational plans before he finally made the choice which was permanent.

I remember having been called into counsel in the case of a young man whose changes were striking. They are none the less typical, however. At the time he was finishing his elementary school work, he and his parents thought he was going to carry such courses in the high school and the college as would equip him for banking. Two or three years later, however, he experienced a great religious awakening and became dissatisfied with his plans to go into banking. He came to feel that this business was selfish and mercenary and that what the world needed was the spirit of sacrifice and unselfishness. In consultation with his parents his plan was modified. He changed from a program which would have led him to banking, to a program in the high school and college qualifying him for the theological seminary and ultimately for a life of religious leadership. I was not in touch with the deails of his development beyond this point, because of leaving that community, but some six or seven years later there came to my desk one day, the announcement of his graduation from one of the professional schools of Columbia University. I was interested to note that he was not graduating from the school of commerce, which would have led him to banking, his first occupational choice, nor from the school of theology, which would have led him into religious teaching and the ministry—his second vocational choice—but he was graduating from the school of architectural engineering which took him out into the field of architecture.

This was a striking case of the changes and adjustments in the fundamental life purposes of an individual, which come about as he matures biologically and as the result of his education and other experiences. It emphasizes the fact that the pupil should be warned to keep studying himself and the opportunities for work in the world with an open mind, to the end that he may ultimately find the work in which he can take most interest and to which he can give most ability with joy and inspiration. It emphasizes that the guidance forces in the school should likewise preserve the open-minded attitude, feeling concerned to work with just as great enthusiasm on any new vocational purpose of a fundamental sort as to continue upon some earlier vocational plan which appeared to be good. Both the pupils and the teacher should be influenced by the consideration that the largest choice or decision is the vocational choice. It is of the greatest importance, therefore, that it should be a right decision when once made.

BUTTON BOX.



BUTTON BOX DESIGNED BY EARL W. ENSINGER, INDIANAPOLIS, IND.

The Job Sheet in Printing

C. W. Hague, Head of Printing Department, The Stout Institute

WITH the wide-spread introduction of job and instruction sheets into the school, the question arises as to whether they are adaptable to all shop courses, or what are their possibilities and limitations. Every instructor asks if they are appropriate for his particular work, and in what way will they be of benefit to his pupils and himself. The printing teacher, like all the others, is waiting to be shown where and how the job sheet can be used to advantage in his classes, and is scrupulous in adopting a new method of instruction until he is assured of its virtues.

Job sheets serve a useful purpose wherever a class of pupils is pursuing individual problems or projects, and in printing this is particularly true because of the many phases of the work involved. It is a means whereby each student receives a carefully graded set of jobs, or exercises, which take him through all of the operations necessary to produce a large range of jobs of a similar nature. Not only that, but they also give the instructor an opportunity to check the progress of his students at any point. He can tell just what each student has done and what remains to be done to reach a definite objective.

The job sheet for printing, like other job sheets, is the natural solution for individual instruction. It may be used to advantage where students carry on various phases of work at the same time, and it eliminates the possibility of omissions and repeats in trade operations. It is not an experiment nor a fad, but is the logical manner of instructing students the sequential order of trade operations to produce a given job. They must not in any way eliminate the teacher, nor decrease the personal contact between the teacher and the pupil, but rather they are intended to supplement the work done by the teacher and to aid him in systematic instruction. They are not intended to replace textbooks in any sense, and will be found most valuable when the definite jobs are supplemented by the technical information given in the text. They are to occupy an important place in shop instruction of all kinds and their value, or danger, lies in the manner in which they will be used.

In printing, like other trades which are composed of a number of distinct occupations, it is seldom that an entire class will be found working at one operation or job at the same time. The nature of the work does not fit itself to class instruction, and the range of equipment does not permit it. The result is individual instruction with the students being placed at all stages of work. The instructor may be called upon to fly from one student to another to give instructions and specifications and to assist with operations, while a part of the class must stand idle awaiting their turn. In many schools the jobs assigned each day are those most needed to be done and without consideration to what the student has done, and should do, to complete the proper training. The student is left struggling with his work and makes many errors due to the lack of definite specifications and mistinterpreted directions. This represents an unfortunate condition in which a class of individuals in the varied stages of progress are being taught without the proper devices and it is practically impossible for the teacher to direct his attention to more than one student at a time.

The job sheet serves as a solution of this situation and the salvation of both the teacher and pupil. We have given a complete set of typical jobs which may be pursued in sequential order, or in the order of their progressive difficulties. The purpose of the job is stated clearly so that the student may understand it and the application, or usefulness of such a job, either in itself or in relationship to other jobs is given. We have listed all of the tools, equipment, and materials to be used for this job. The specifications for this particular job are given plainly, and may be used as a check at any point during the construction of the job.

Listed in the proper order or procedure are the steps for pursuing the job itself, which describe clearly what must be done and how to do it. At the end of the sheet the student finds a set of questions pertaining to the job, or to the operations involved in producing the job, which will cause him to think and check the thoroughness of his understanding of the work he has completed. Another important feature which greatly adds to the value of the job sheet is the possibility of illustrating with drawings and photographs, the finished job, steps of operation, and the tools to be used. The student can visualize at a glance what would probably have taken much of the teacher's time to explain.

The value of the job sheet in any class is directly dependent upon the effective preparation of the sheets and the manner in which they are used. Without a doubt these sheets are most valuable and effective when they are written by the instructor himself, and with a view of adapting them to the needs of his particular students and to suit local equipment and conditions.

Before attempting to prepare a set of sheets for any given course the teacher should thoroughly analyze the work to be involved and keep in mind continually the objective of the course. The following points will serve as a guide in the preparation of the sheets:

1. *The Objective of the Course.*—What is this course intended to do for the pupil? What is the real purpose of the work in the school in which it is taught?

2. *Selection of Jobs.*—What jobs must be done in order to have the student fulfill the objective or purpose? Which jobs will most effectively train the pupil in the understanding of the work? Are the jobs typical of a large range of similar jobs.

3. *Function of Each Job.*—What is the particular function of each job in relationship to the development as a whole? To the present needs of the pupil? Is it essential to include this particular job, or could the objective be accomplished without it?

4. *Sequential Order of Jobs and Operations.*—Are the jobs selected of such a nature that they will offer progressive growth in skill, trade knowledge, and general development? Are the operations involved to be pursued in the order of their progressive difficulties.

5. *Thoroughness and Clearness.*—Do the sheets contain the complete information for the production of the job in the proper order of procedure? Is the student given a clear understanding as to why, and how, each operation is to be done? After completing this job, could the student produce another job of a similar nature?

6. *Thought Reaction on the Part of the Student.*—Is the material given such that it will cause the pupil to think for himself while he is working? Has he been given a thorough understanding of the importance of this job and its relationship to other jobs which he has encountered?

7. *Teacher's Check and Personal Contact.*—Has a means been provided for checking the progress of the pupil and his mastery of every step of the job? Do the questions on the sheets cause the student to understand the work in order to answer them correctly? Has a means been provided whereby the personal contact between the teacher and pupil will be retained while the job is in progress of construction?

The actual writing of job sheets is simply a matter of compiling classified knowledge in a form best suited for use by the student. In teaching any subject, or opera-

tion, to a class a teacher must follow a definite procedure of presentation, dependent upon the nature of the content to be presented. In operations which go to produce jobs, the things which the student must know are: First, the kind of a job and its purpose; second, the definite specifications to be used for the particular job involved; third, the tools, equipment, and materials to be used for the job; and, fourth, the steps of operation in the proper order of procedure. Other things may effectively enter, such as related technical material, and questions pertaining to the job for purpose of thought reaction on the part of the student.

In the production of job sheets this same procedure is followed and a standard form is used so that the pupils may become familiar with the order of procedure. Having analyzed the work to be covered, it is simply a matter of placing in written, or printed form, the jobs or operations to be presented. The sheets are placed in the hands of the student in the order in which they are to be pursued, with instructions to read them carefully, study them thoroughly, and to return with any questions necessary to start the job.

If the job includes new operations the instructor gives the demonstrations in the same manner as though the sheets were not used. Where it is possible it is advantageous to perform the demonstrations to groups, rather than to repeat them for each individual, but the demonstration must be put into immediate practice by the student so that he may master it. Any lectures or technical information necessary for the efficient execution or manipulation of the job will be given verbally by the instructor at the time which best applies to the procedure. The student must be given a thorough understanding of what is to be done, and how it is to be done. The personal contact is retained between the teacher and the pupil so that the pupil may be aided at any stage of the job. In this way the burden of the teacher may not be materially lightened, but it gives him an opportunity to do more effective work and obtain increased efficiency from his pupils. The interest of the student is maintained by the fact that he knows just what to do, and he can compare his finished product with that shown on the job sheet.

The job sheet for printing has been greatly simplified by the supplementing of the so-called trade process sheets, or operation sheets. Where a number of jobs involve the same basic operations, as do those in the composition of type, it would not be practical to repeat these operations in detail in each job. The trade process sheet is similar in many respects to the regular job sheet excepting that a single trade operation is dealt with instead of a complete job, and the specifications are applied to any job which involves this operation. A single job sheet may involve the use of as many trade process sheets as there are basic trade operations, but these same process sheets may also be used in jobs involving similar operations. When a point is reached in the job sheet where a basic operation is to be done, it simply refers to the corresponding trade process sheet for this information. In this way the process sheets are dove-tailed into the job sheets and they eliminate repeat information and make clear to the student that the same basic operations apply to all jobs of a similar nature. It is advisable for the student to discard the process sheets as soon as the basic operations have been mastered.

The job sheet is used as a medium to increase the proficiency of the student, not as a teacher, but under the careful supervision of the teacher. It is the best device which has so far been placed in the hands of the shop teacher, and it is his salvation so long as he does not abuse it.

EXECUTIVE COMMITTEE OF THE NEW JERSEY VOCATIONAL AND ARTS ASSOCIATION WHICH HELD ITS ANNUAL CONVENTION IN PATERSON, N. J., FRIDAY AND SATURDAY, MARCH 19TH AND 20TH, 1926.

TOP ROW: Lloyd F. Stair, Madison, N. J.; Frank J. Rodgers, Elizabeth, N. J.; J. H. Constantine, Passaic, N. J.; Aurthur Perry, Rahway, N. J.

MIDDLE ROW: Elsie Schmidt, Newark, N. J.; Mabel H. Wells, New Brunswick, N. J.; Jane Seward, New Brunswick, N. J.; Marguerite Tiffany, Montclair, N. J.; Mary Buckley, Paterson, N. J.; Rose Galida, Newark, N. J.; Josephine Kaul, Elizabeth, N. J.

BOTTOM ROW: Leonard Stolk, Secretary, Paterson, N. J.; Ruth Culley, Treasurer, Plainfield, N. J.; Philip M. Wagner, President, Newark, N. J.; Clara H. Krauter, Vice-President, Atlantic City, N. J.; May Dunn, Paterson, N. J.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

CONCENTRATION—HABIT—READJUSTMENT

Concentration forms habit. No sooner is habit formed than situations arise to demand new habits or the destruction of the old ones. Readjustment is a prime and constant necessity in practically all of life's activities.

A writer—an inveterate smoker—found himself suddenly transferred from one office where smoking was the usual and constant practice to one in which smoking was forbidden. At first he sat and stared at his typewriter or gazed languidly out of the window. Finally after a struggle, he adjusted himself to the situation and proceeded with his work.

Another man moves from the small, noiseless town to the city and finds himself in an office alongside of the elevated or in the midst of the confusion of downtown traffic. At first he is bewildered and helpless. Then he also adjusts himself until the noise and confusion seem a part of the office routine and furniture.

Habit—ability to concentrate—readjustment. We live by habit and yet it seems that some people almost die by habit. Sometimes the classroom and all the work of the school are so quiet, so undisturbed, that the student forms the habit of being able to think only in absolutely quiet surroundings. Some people think clearly sitting down, but are distracted and confused by the simple act of standing.

While it certainly is not the thought to advocate deliberate noise and confusion in school, there is something to be said for the *busy, active* environment. And then there is much to be said for the conscious training of oneself or his students to concentrate his mind and his powers on the business in hand under any reasonable conditions of environment.

A clerk in a china store fell from a ladder and broke a great quantity of expensive china with a resounding crash. The manager, without excitement, motioned to the other clerks to go right on with their work. In a quiet way, he assisted the unfortunate clerk to his feet and without confusion or agitation, started the task of removing the fragments. Many another manager would have permitted the sales force to gather in confusion about the scene, condemned and berated the luckless clerk, and called loudly and angrily for help to clear away the debris.

The man who is trained to concentrate on the job in hand and at the same time to be able to meet an emergency with composure and self-assurance is an educated man. If he cannot do this, it may be argued with considerable justification that his education is seriously defective.

OPINIONS DIFFER

Unanimous opinions may be taken for granted. They need little emphasis. We hope and desire to express occasional ideas that are not unanimous.

We received a letter from Royal Bailey Farnum in response to the editorial "Divided We Fail," which appeared in the March number of the INDUSTRIAL-ARTS MAGAZINE, that invites discussion.

From Mr. Farnum's letter we read, "I was interested, though somewhat disappointed, to find that a magazine which stands for art in industry and art generally should give emphasis to the proposition that our art teaching has somewhat failed in comparison to other subjects."

One statement in our editorial which caused Mr. Farnum's disappointment was, "On the whole we are of the impression that, while art has been rather well impressed through application to some practical interests by teachers of manual subjects, the art teacher has had difficulty in holding place as a distinctive subject the teaching of the fine arts."

Mr. Farnum does not deny the truth of this statement; in fact he emphasizes the comparative success of the art teacher by comparing her accomplishments with the teachers of other subjects under adverse circumstances of time allowance and lack of support from school officials and teachers of other subjects. His purpose is evidently to eulogize the art teacher and his disappointment lies in the fact that we do not soft-pedal the anemic conditions of art in the public schools.

When a subject of such vital educational interest is given a place of least importance in our schools; when art is labeled a fad and a frill; when art teachers have been the first to feel the effects of retrenchment; it is evidently time for those who are interested to study the situation carefully, state their convictions clearly, and prescribe a remedy.

In the editorial in question we express difficulty in sharing with C. Valentine Kirby the impression that teachers of art have gone farther and accomplished more for art education than teachers of other school subjects have accomplished for their chosen interests.

Mr. Farnum regrets that we confined our reference to Mr. Kirby's argument to this one conclusion, because he insists that Mr. Kirby struck an optimistic note successfully and with considerable proof, in emphasis of the general and broad progression of art education over other school subjects.

Under the caption "Have We Made Good?" Mr. Kirby did answer his question in the affirmative and with considerable proof, but that is no reason why we should review or quote further than served the purpose of our editorial.

Without conceding to any individual or organization a greater interest or faith in Art Education than ours, we are conscious of a deficiency in the content and methods of instruction; a lack of definite objectives and

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TRACING SUPPLEMENT No. 17
THE INDUSTRIAL-ARTS MAGAZINE

TRACING SUPPLEMENT No. 17.
THE INDUSTRIAL-ARTS MAGAZINE,
MAY, 1926.

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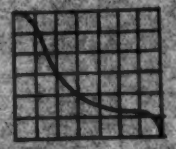
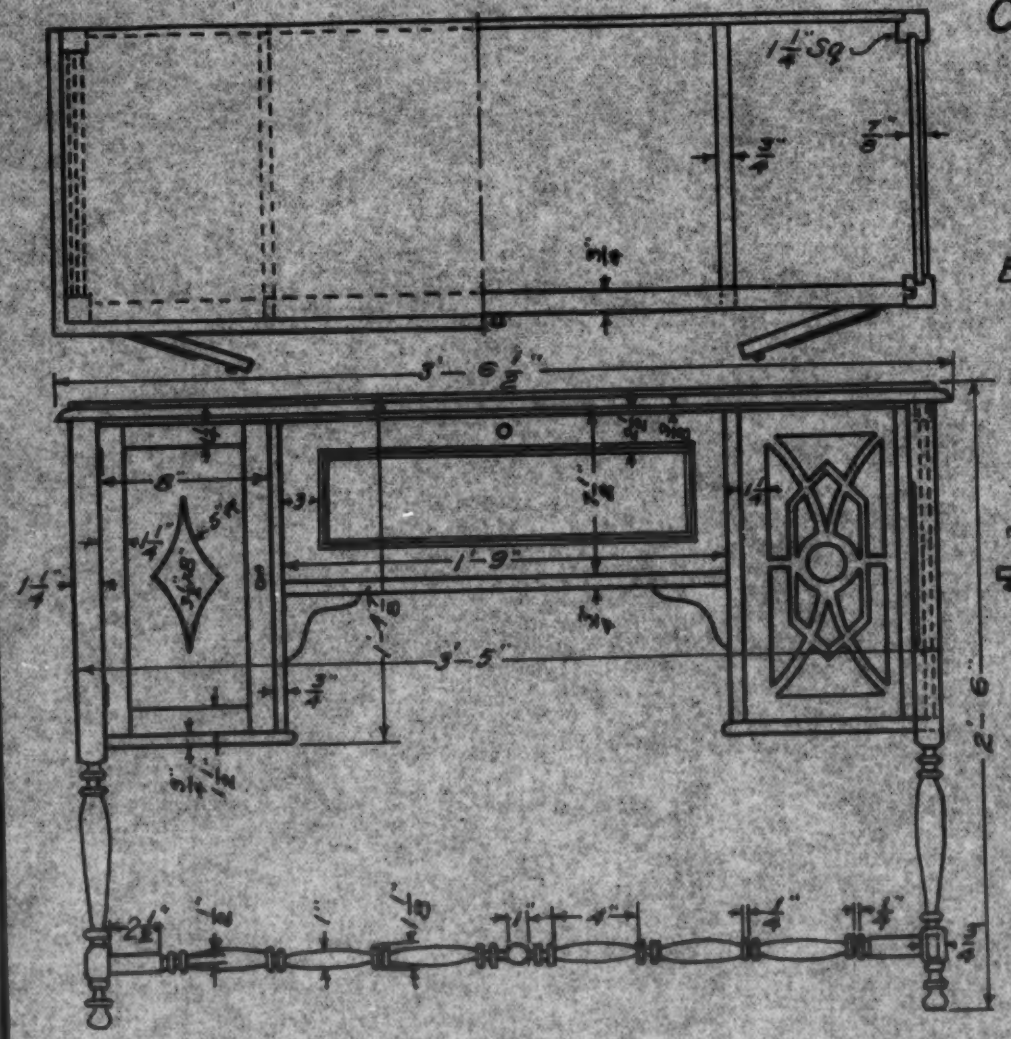
CONSOLE CABINET

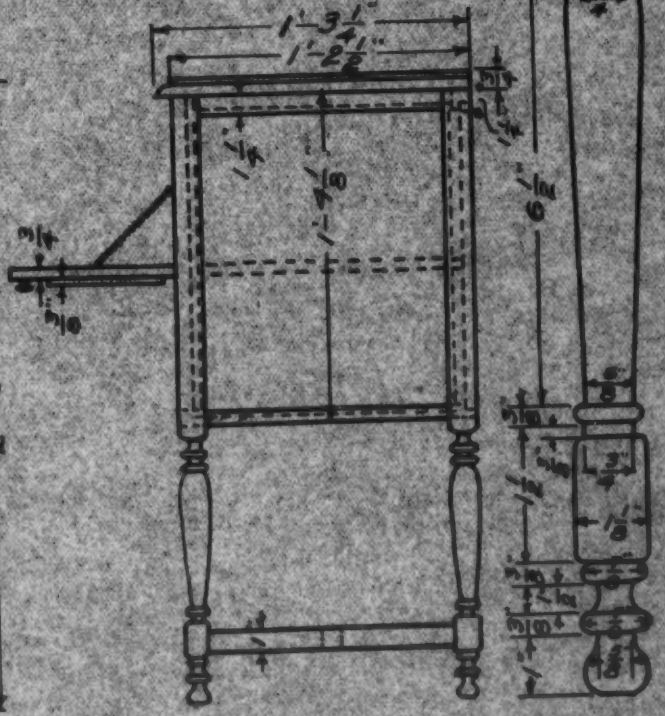
SCALE 1½ IN.=1FT.



1" Squares

BRACKET-2 Reqd





R.O. Buck – Chicago

For Details see Page 176, Industrial-Arts Magazine, May, 1926.

Drawing by R. O. Buck, Chicago, Ill.

TRACING SUPPLEMENT No. 18.
THE INDUSTRIAL-ARTS MAGAZINE.
MAY, 1926.

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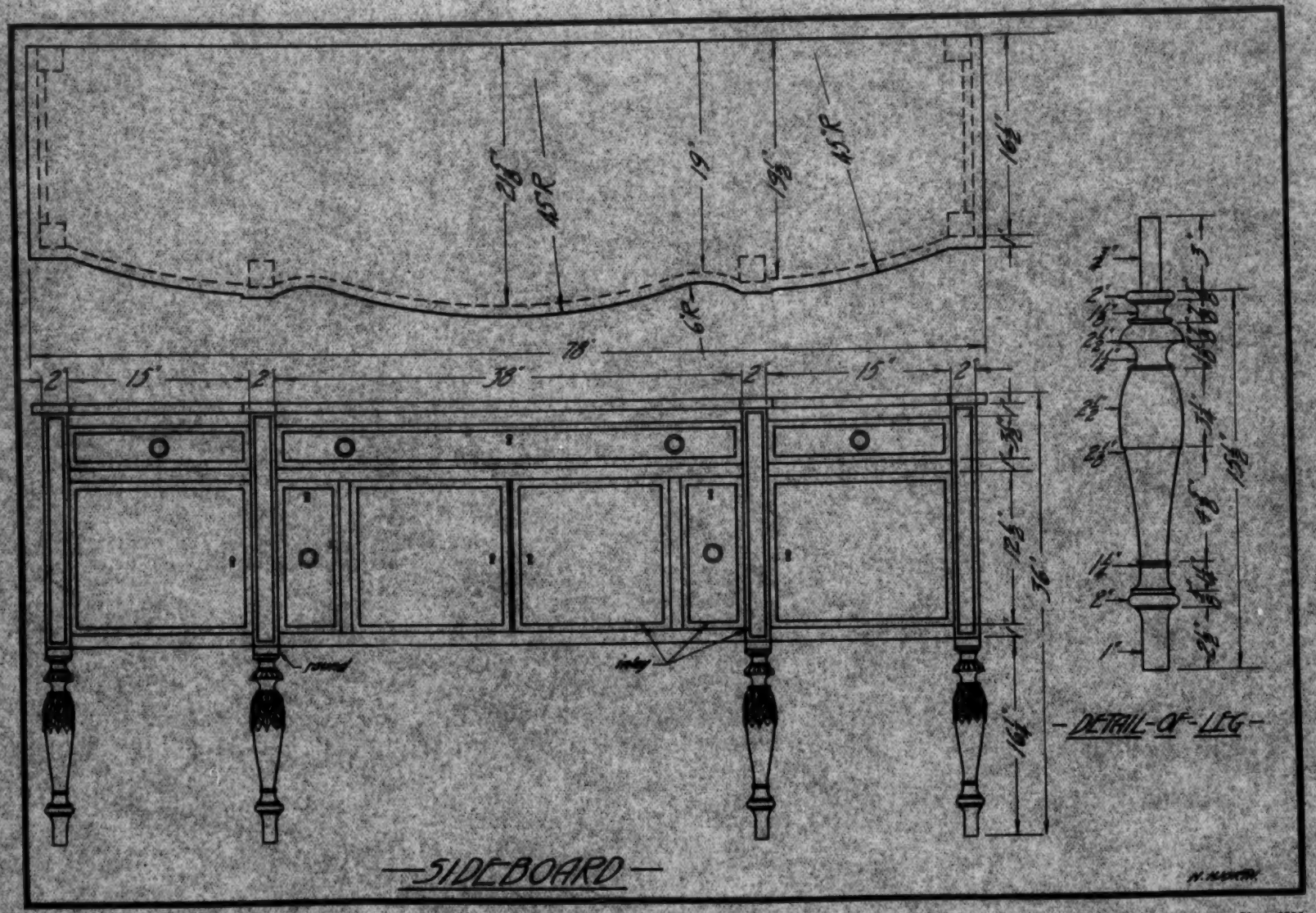

Drawing by Herman Hjorth, New York, N. Y.

FIGURE 2.

For Details see Page 372, Industrial-Arts Magazine, May, 1926.

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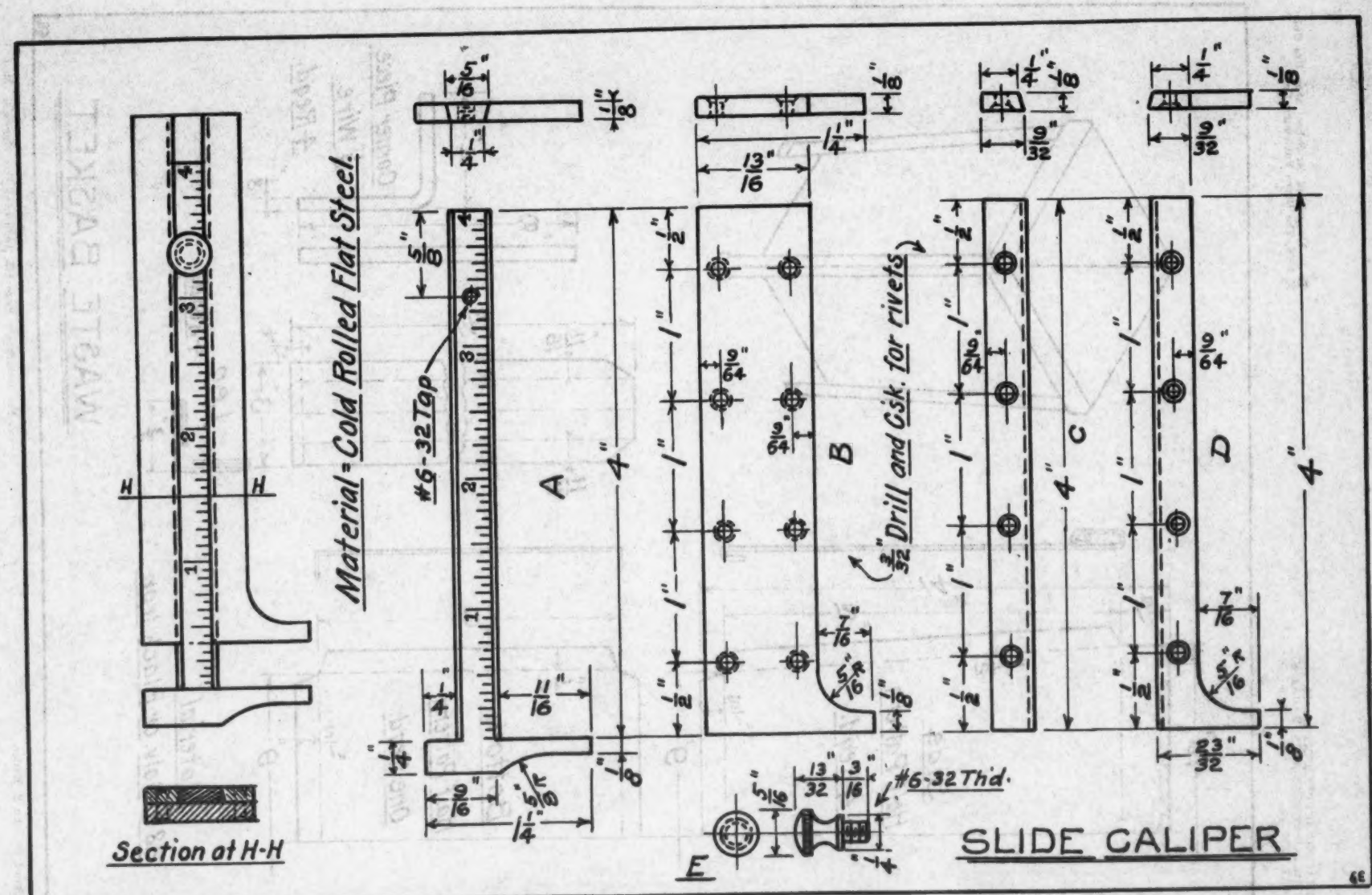

For Details see Page 178, Industrial-Arts Magazine, May, 1926.

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THE INDUSTRIAL-ARTS MAGAZINE.
MAY, 1926.

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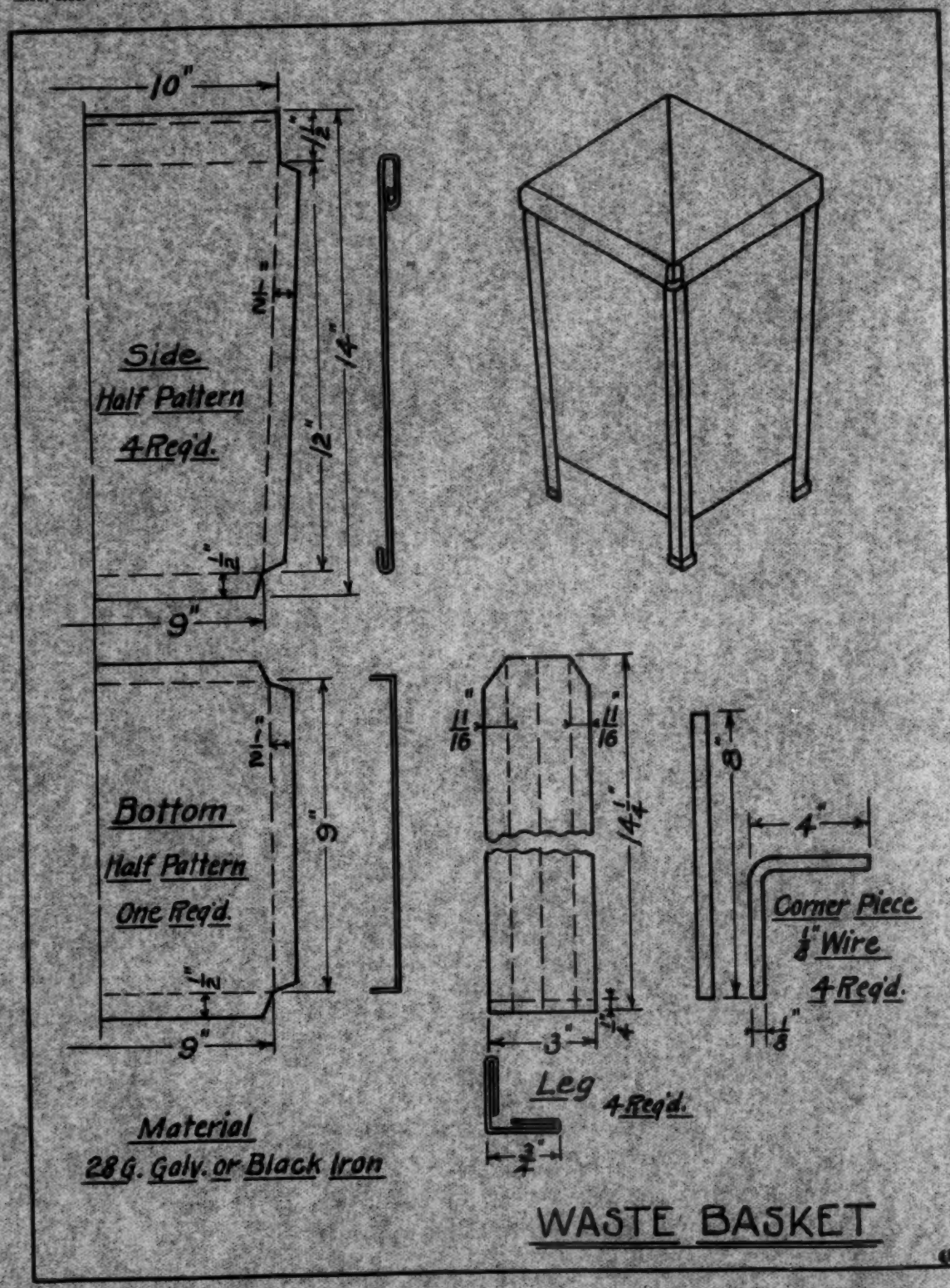


Designed by John B. Butler.

For Details see Page 172, Industrial-Arts Magazine, May, 1926.

trained teachers to warrant the subject the place it deserves in the schools.

We are also conscious of the futility of glorifying the subject over other school interests. In fact art is so much a part of all worthy human interest that it must influence and enrich other school subjects as it does the interests of life outside the school.

Divided we fail; united in purpose and plan we must succeed.

THE CYCLE OF REQUISITIONS

The foresighted supervisor is now putting the finishing touches on his fall equipment specifications. He has studied the progress of his department during the year. His records cover the consumption of materials by students and instructors. Obsolete equipment has been slated for the "machinery exchange" and new equipment has been studied. A department to be efficient next fall, must be inventoried right now and specifications drawn for the tedious and sometimes perilous journey through the school purchasing department, supplies committee, superintendent's office, and the school board.

The American school board is very frequently confronted with rules or state legislation requiring the publication of bids or the letting of contracts under routine provided by law. This takes time and delays are not uncommon. In larger systems, requisitions come in from dozens of centers and the estimates of equipment and supplies are bunched for orderly purchasing. In some communities the school board is most exacting on the details of purchases and demand certain forms to be followed as a matter of protection and caution. All this takes time and adds to the delay in purchasing.

About ninety days represents the average "cycle of requisitions" from the teacher to the delivery and installation of school equipment and supplies. The supervisor who rushes his specifications through in June just as he leaves for his summer vacation may find many "shorts" in September when the youngsters come trundling back to school. The "cycle of requisitions" is about like the law of supply and demand. It is working when you least expect it, and it hurts most when you can't get what you need so very badly.

In making up specifications for the fall of 1926 supervisors and teachers are alike warned against the requisition of anything but standard brands and sizes. The manufacturers most competent and willing to serve tell their story each month in the advertising pages of the INDUSTRIAL-ARTS MAGAZINE. Information about sizes, style of equipment, service in school shops, can be obtained from the manufacturers by the simple device of an inquiry by correspondence. A concerted program to restrict purchases to the known standard items is to be emphasized at this time. If a manufacturer by telling his story each month in the advertising pages of this publication suggests his anxiety to be of service to you, the wandering into greener fields is a practice to be guarded against.

On equipment involving installation problems, the "cycle of specifications" involves another problem. If room must be provided for equipment, shipping dates must be scheduled with manufacturers. A large order of lathes or a complete printing equipment should not be ordered by wire on August 15, with hopes of complete installation September 1, 1926. Manufacturers will and do give wonderful service. But why take chances when specifications prepared now can be passed on by school executives and school boards and orders placed "subject to delivery August 15"?

The cycle of requisitions has not been studied and watched by all supervisors in the past. In many cities the problem is finding an excellent solution. Will you be all set to go next September with equipment and supplies just as efficiently purchased and installed as the older departments in your school?

ORGANIZATIONS BIG AND LITTLE

The proposition of merging the sectional organizations with the national organization of teachers and representing the interests of state groups by delegates to the national organization seems to promise effective results.

At the recent Des Moines conference the Vocational Education Association of the Middle West so merged with the National Vocation Association.

Organizations of teachers covering several states in membership have served their purpose well through the faithful service of a comparative few leaders in each of several allied interests but have gradually become divided according to differences of interest or have become unwieldly by reason of different interests involved.

Great numbers of busy teachers find it impossible to attend more than the meetings of their local organization. From local unit to state to national organization by delegated representatives is the logical method followed by interests in the professions and in social and political organizations. It might work no less effectively with teachers.

We surmise that the burden of effective service to the individual teacher would rest largely with the local and state groups.

It is no easy matter to bring issues of national importance to the concern of state groups. It is no easy matter to bring matters of state-wide importance to local groups. Can the local teacher be given the professional incentive which will assure the support of delegates to the state organization? Can the state organization be given incentive to support the national organization? Can the national organization render effective service to the individual teacher through effective administration of national interests? We hope and almost believe that these things can be done with decided improvement to all concerned.

Little Arguments on Great Principles

ABSENT TREATMENT

"Has Mixer told you of his great luck, Mr. Try Square?" asked Frills, the art teacher, as he settled into his seat for a little rest between classes.

"Yes, I suppose so," replied Try Square. "He has whispered out loud to me that he has a standing offer from a newspaper syndicate to prepare one illustrated article each week on industrial education at a handsome salary, if that is what you mean by great luck, Mr. Frills.

"But Mixer gets a new job so frequently that I have lost interest in his adventures. Last fall he confided to me that he had a broadcasting job with station Z.I.P. I sat up for several nights trying to get some of his educational squibs on my radio but never could locate him, and when I asked him about it he told me that he had given it up for lack of time. Now I understand that he has signed up a contract with The World Wide Newspaper Syndicate for another venture in long distance education."

"Wonderful, isn't it?" drawled Frills.

"Wonderful! what is wonderful?" asked Try Square curtly.

"Why! this long distance, absent treatment by which the great teachers of the world are able to conduct classes of thousands of people through the press and the radio," replied Frills.

"Conduct classes!" exclaimed Try Square; "do you call that conducting classes?"

"To be sure!" said Frills confidently; "the original log, with a teacher on one end and a pupil on the other, has been extended around the world from east to west and north to south, reaching the secluded hamlet no less than the busy city; crossing the sea and the desert and giving its message to the multitude."

"Frills you are an artist with words as well as deeds," said Try Square with a grim smile; "if you use that oratory with your classes you ought to get a job with Mixer teaching art by the press or the radio. Old Professor Dome used to say that he could visit a class through the key hole and grade a teacher by the busy silence of the room.

"I conduct my classes on the principle he laid down, that the less said in the classroom by the teacher, the more work done by the pupils.

"I notice that when the Sunday paper comes to our house, the funny sheet and the sport page are most in demand, and I notice that when the radio is turned on my youngsters take more interest in getting a variety of stations than they do in listening to any one program.

"I think you exaggerate the press and the radio as educational forces. They are wonderful inventions to be sure, but one great convenience appeals to me with regard to the radio; you can turn off your teacher or preacher with a little twist of the wrist if you do not like his stuff."

Sideboards

Herman Hjorth, New York, N. Y.

THE sideboard, as we now know it, is of comparatively recent origin. It was developed during the Georgian period (1750-1800) by Thomas Shearer, an English cabinetmaker. Shearer was the contemporary of George Hepplewhite and Thomas Sheraton, and the type of sideboard designed by him was improved upon and refined by the latter two and more famous of the Georgian masters.

During the earlier periods, different kinds of cupboards were used in place of sideboards. These cupboards were used for the keeping of foodstuffs. Some of them were made to hang on the wall, some to stand on a table, and others—big, cumbersome and heavy pieces—to stand on the floor. From these different types of cupboards, side tables, buffets, and dressers were evolved. The first were long, narrow tables placed against the wall and used for the serving of food. The second were heavy tables, with an arrangement of shelves above for the storage and display of platters and China ware. The third type was like the second, except that its lower part contained doors or drawers like a cupboard.

These side tables, buffets, and dressers continued to be made during the succeeding periods, with certain modifications in design typical of the period in which they were made.

The Adam Brothers (1762-1795) are responsible for designing a type of sideboard, which may be said to form the connecting link between the old side tables, buffets, and dressers and the modern sideboard designed by Shearer, Hepplewhite, and Sheraton. The Adam sideboard consisted in reality of three separate pieces, a side-table in the middle and two square pedestals placed at each end of the table. Knife boxes very often decorated these pedestals. The purpose of knife boxes was to hold knives and forks. They were made of wood and were sometimes shaped as a box, but more often as a classical urn. They were often carved and inlaid.

The sideboard, illustrated in Fig. 1, is designed to conform to the characteristics typical of the Jacobean period (1603-1688) and is therefore not a copy of an antique, but an adaptation. Some of these characteristics are the squareness of form, the stretchers between the

GEORGIAN SIDEBOARD (See Supplement No. 18).

legs, the shaped molding around the drawers, and the pear-shaped drawer pulls.

While a sideboard is generally considered as a rather ambitious piece of cabinet work to undertake in the school shop, it will be found on closer analysis of the various phases of the construction that it is not so difficult after all. It only takes a little longer to make on account of its size.

The first thing to consider in making a sideboard is the framework, as the top, doors, drawers, and partitions, are made and fitted in place after the frame has been glued together. The frame consists of the front, the back, the two sides, and the bottom. The legs, either six or eight in this case, are turned and mortised for the rails and stretchers. For the sides and rear panels, a groove is cut in the corresponding legs on the circular saw with the dado head.

The sides are glued up, cut to size, and rabbeted to fit the groove in the legs. They are then glued up (including the stretchers), planed and smoothed. When the drawer rails are glued and screwed in place, as shown in the detail drawing, Fig. 1a, the framing of the sides is completed.

The back consists of two rails, three stiles, and four panels. If the sideboard is made with eight legs as shown on the photograph, only one stile is used in the center, and the extra two legs are used in place of the other two stiles. This construction is more substantial, but also more complicated. The rails and stiles are first mortised together, but also more complicated. The rails and stiles are first mortised together, after which the grooves (5/16") are cut for the panels. These are cut to size, fitted, planed and smoothed, and the whole back is then glued together. After the glue has dried, planing and smoothing completes the framing of the back.

The front rails and stretchers are now fitted into the legs, and the middle section is glued together. Drawer rails, like the ones made for the sides, are made for the middle front legs, to which they are joined with dowels. The bottom may be built up of panels as shown, or it may be screwed to the underside of the lower drawer rails. In the first case four panels should be made and fitted before the final gluing of the frame; in the second case the bottom may be made in one piece and fitted in place after the whole frame has been glued together. This latter method is the easier, and if the bottom is made, so that it does not extend to within an inch of the front and sides of the frame, it will not show.

The parts of the frame are now ready for assembly. They are: The two sides, the back and the rear stretcher, the middle front section, six front rails and two stretchers, and six drawer rails connecting the middle front legs with the back. In gluing care should be taken to draw up tightly all joints, to square the whole frame, and to clean off the surplus glue with hot water. When the frame is dry, it should be planed and smoothed very carefully, after which the drawers should be made and fitted in place.

The drawer fronts are stronger and less likely to warp and shrink if they are built up from thin layers of wood with the grain running in opposite directions (three or five ply). Blocks 3/8" thick and shaped as shown in

JACOBEAN SIDEBOARD.

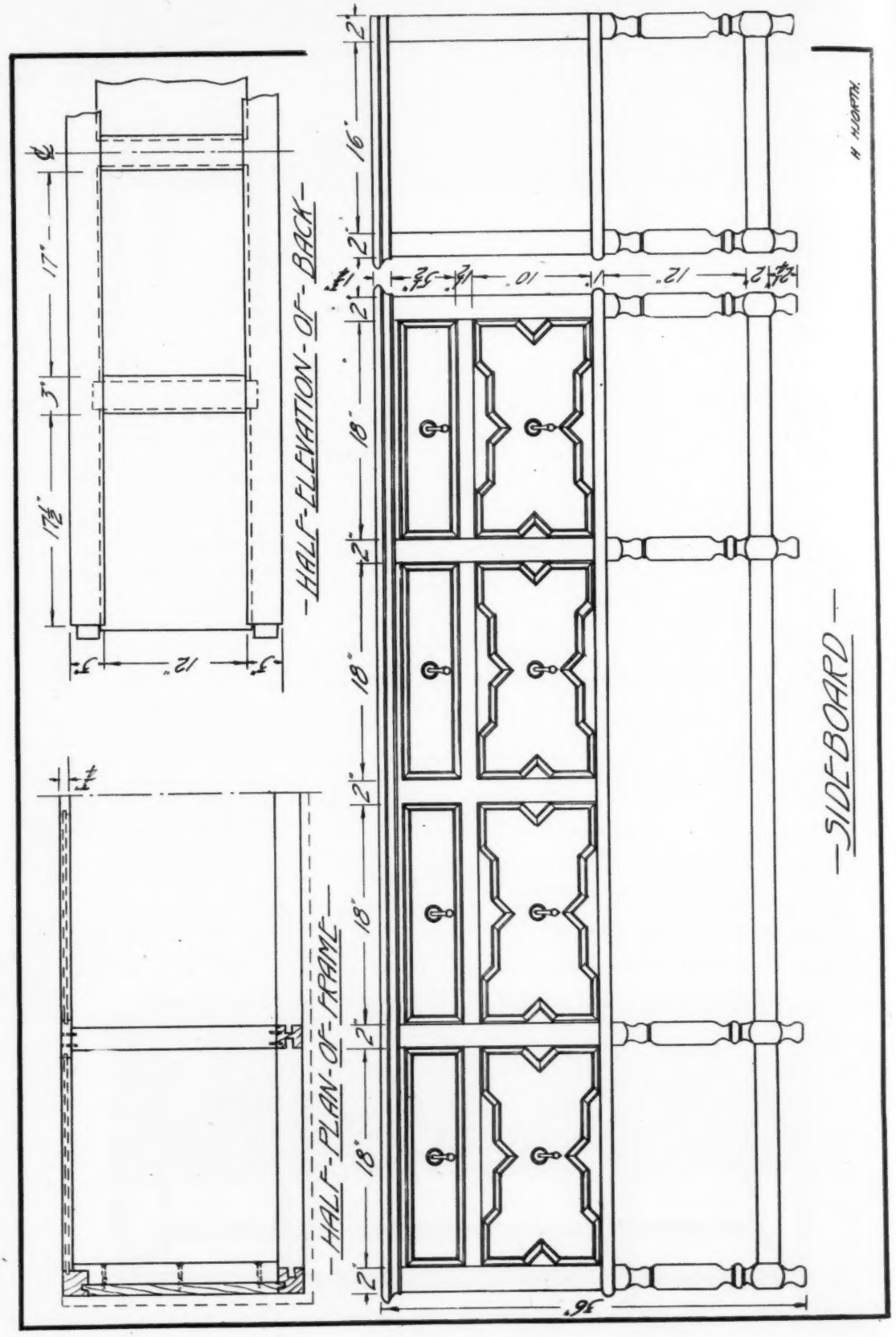


FIG. 1.

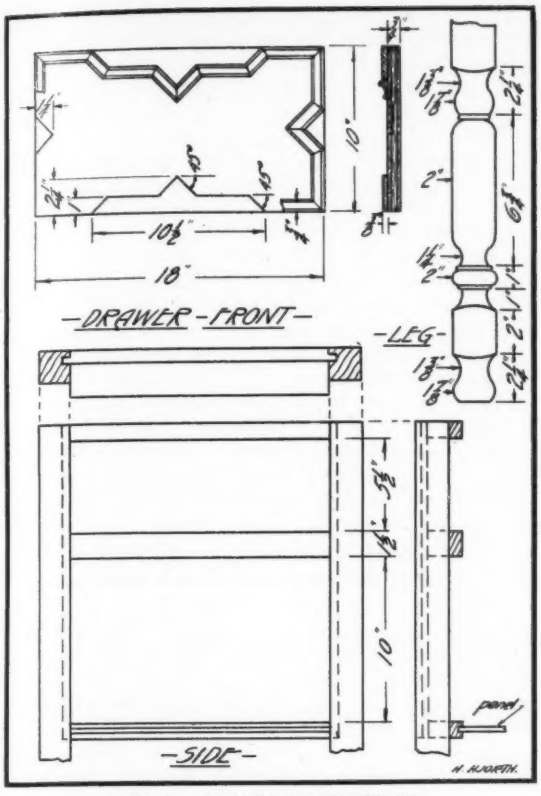


FIG. 1a. DETAILS OF SIDEBOARD.

Fig. 1a are glued in place on the lower drawers, and the molding is fitted and glued around them. The top is screwed to the upper drawer rails, after which the molding underneath it and the one below the drawers are fitted and glued in place.

This sideboard was made of mahogany. It was colored with a solution of bicromate of potassium and water, given a coat of wood filler, and finished with several coats of boiled linseed oil.

The sideboard, Fig. 2 (See supplement No. 18), is typical of the Georgian period. Although it looks very different from the Jacobean sideboard, its construction is nevertheless similar and the method of procedure practically identical.

The legs in this sideboard are made in two pieces, one of which is square and the other turned. The square pieces are first put in the lathe, rounded at their lower extremities, and bored for the ¾" tenons of the turned pieces. The four front legs are then inlaid with a fine line of satinwood as shown. These lines can be bought ready made from any firm dealing with marquetry materials. The actual work of inlaying is very simple and easy. An ordinary marking gauge is used, the spur is removed and a piece of steel—a piece of an old hack-saw blade will do—is shaped and sharpened like a 1/16" chisel and fastened in the marking gauge in place of the spur. The shaping of this piece of steel must be done on an emery wheel as it is too hard for a file. Try scratching a groove on a piece of waste wood, and if the groove is too wide, grind the piece of steel until it cuts a groove that is just right. The inlay is mitered in the corners, thin glue is then run into the grooves and the inlay is glued in place. Surplus glue is wiped off and the piece left to dry, after which it is scraped and sanded.

After the legs are inlaid, they are mortised and cut for the rails, sides, and back as described above. The whole frame is then glued together without paying any attention to the turned part of the legs, which can be glued in place at any time.

It will be noticed that the lower part of the sideboard has two drawers and four doors. Where there are doors, it is better to fit the bottom to the top of the rails, as it then forms one continuous smooth surface and also serves as a stop for the doors. The two tall and narrow drawers are designed to hold bottles.

The turned part of the legs has been ornamented with some simple carving, which is quite easy to do, and for which only a chisel and one or two gouges are necessary.

No stain was given this sideboard, as it was made from mahogany beams used in a building in Santo Domingo several hundred years old. The photograph only faintly gives an idea of the beauty and richness of color of this old wood. It was given wood filler, however, and rubbed with thin, boiled linseed oil.

A GUIDE TO THE SUPERVISION OF GENERAL INDUSTRIAL EDUCATION

It has often been said that necessity is the mother of invention. In an attempt to establish a concentrated means of supervision which would be most effective, carry some degree of permanence, and leave a clear conception of the desirable situation on each point of the industrial education work of the state, State Supervisor Dean M. Schweickhard of St. Paul, Minn., has devised an instrument to be used especially in departments of industrial training, home economics, and agriculture as a means of rating the several departments.

The device is made up of a set of questions covering the various points upon which a general industrial department may be judged, divided conveniently into four groups, dealing, respectively, with the rooms provided for the work, the equipment available, the plan of work undertaken, and the results secured in so far as these may be specified in the present stage of development.

Special Department Rating

	Yes	No
I. Rooms		
1. Does the total floor area meet the minimum requirements?		
2. Is the floor level at grade or above?		
3. Are floors appropriate for the use to which the room is put?		
4. Is the space conveniently divided into the necessary working units?		
5. Are all rooms provided for the departments adjacent to one another?		
6. May each shop or laboratory of the department be entered directly from the hall or outside entrance, without passing through another room?		
7. Are the rooms so situated as to be conveniently accessible from the rest of the school plant?		
8. Are the rooms free from handicaps imposed by limitations elsewhere in the building?		
9. Is each room well insulated to prevent disturbances?		
10. Is a special space provided for class recitation?		
11. Are all ceilings twelve feet or more in height?		
12. Are walls and ceilings of such a nature as to reflect the light satisfactorily?		
13. Is the surface of walls and ceilings smooth?		
14. Are rooms sufficiently well lighted to permit the conduct of classwork without the regular use of artificial light?		
15. Is serviceable artificial light provided where necessary?		
16. Are rooms satisfactorily heated?		
17. Is there satisfactory ventilation in all rooms?		
18. Are exits adequate for the practical passage of pupils?		
19. Are exits adequate for the practical passage of equipment and supplies?		
20. Is running water piped to the department?		
21. Are adequate outlets provided in each shop or laboratory for the use of water?		
22. Is there a satisfactory means provided for the disposal of waste?		
23. Is power available for use in the department?		
24. Is a specific place provided for the instructor's desk?		
25. Are rooms provided for this department utilized exclusively for work within this field?		
II. Equipment		
26. Are desks, tables, or benches adequate for enrollment?		
27. Is the quality of this equipment satisfactory?		
28. Are chairs or stools provided where necessary?		
29. Is the general stationary equipment adequate for the needs of the work to be done?		
30. Is there sufficient blackboard space?		
31. Is provision made for storage of individual property?		
32. Are adequate cupboards and other general storage space available?		
33. Is the arrangement of all stationary equipment the most desirable from the standpoint of convenience?		
34. Is it most desirable from the standpoint of instruction?		
35. Is it most desirable from the standpoint of safety?		

FIG. 1.

36. Are desks, tables, or benches thoroughly cleaned at the close of each lesson?
37. Is each class held responsible for leaving general equipment in condition for immediate use by the following class?
38. Is any specific plan followed for keeping floor clean and tidy?
39. Is definite provision made for regular upkeep of the equipment?
40. Is equipment put in such condition that it will not deteriorate during vacation periods?
41. Are individual sets of equipment adequate and uniform?
42. Is there a specific plan in operation which insures that each set of equipment is left in proper condition at the close of each lesson?
43. Is a spirit of vigilance maintained throughout each class to the end that each individual carries a proper share of responsibility for keeping the whole room in order?
44. Is the supply of text and reference material adequate?
45. Does the school provide a serviceable supply of magazines?
46. Does it supply sufficient charts and illustrative material?
47. Is hygienic towel service provided for the use of the pupils?
48. Is a practical fuel provided in sufficient amounts for the department?
49. Does the school purchase the necessary materials and supplies?
50. Is an accurate record kept of all expenses and receipts of the department?

III. Plan of Work

51. Is the course of study developed with reference to the needs of the community?
52. Are all such community needs provided for in the course?
53. Are various local citizens called upon to supplement the classroom instruction from their background of practical experience?
54. Are opportunities for local observation outside of the school made use of?
55. Is there a definite goal for each year's work?
56. Is a definite standard of accomplishment required?
57. Is this standard clearly understood by students?
58. Is there definite preparation for each day's teaching?
59. Are specific instructions given for each new undertaking?
60. Do instructions include related and supplemental information?
61. Are students required to supplement classwork with outside study?
62. Is the developmental method used in teaching?
63. Are demonstrations made use of frequently and regularly?
64. Does the course cover the essential points necessary for a well-rounded education in the subject?
65. Is any standardized system of measurement used in grading pupils' ability?
66. Are any objective tests used in testing pupils' work?
67. Does the distribution of instructor's time permit of vital, concentrated instruction?
68. Does the instructor have at least one-eighth of the total teaching time for preparatory work?
69. Is the instructor free from other duties before and after school?
70. Is the instructor free from other teaching or classroom responsibility during the school day?
71. Do pupils arrive from and depart for the other classes without loss of time in this department?
72. Are pupils required to dress appropriately for work while in the shop or laboratory?
73. Is a daily record kept of each student's work?
74. Is each lesson period 80 minutes or more in length?
75. Is the required minimum amount of time or more, devoted to this work?

IV. Tangible Results

76. Is this work elective in the high school?
77. Is the way open for election in this work without interference from other subjects?
78. Do at least 80 per cent of the eighth grade graduates elect this work in the high school?
79. Are pupils eager to continue the work beyond the first year?
80. Do the majority of parents show sufficient interest to attend an exhibit or program of the department?
81. Do the parents express interest in the products taken home?
82. Is community interest indicated by a spirit of support on the part of farmers, business people, and homemakers?
83. Does the superintendent consider this department an indispensable part of the school system?
84. Does the school board hold the same opinion?
85. Has the work of the department ever been recognized as having special merit by an official judge or committee of judges?
86. Do teachers of other subjects admit that work in this department contributes unquestionably toward the establishment of desirable habits in general education?
87. Do the pupils assume definite home duties as a result of school training?
88. Is there specific evidence that these courses stimulate individual thinking regarding the selection of a life activity?
89. Do the occupations of the graduates indicate that the work in this department has influenced their choice?
90. Do pupils make intelligent inquiries which show a vital interest aroused by classroom work?
91. Does the work of the department influence the outside reading of the pupils?
92. Does the majority of the class very nearly approach the finished product standard held up for the class as a whole?
93. Do results indicate that the standards were set correctly?
94. Do finished products or results indicate that the pupils understood the instructions given?
95. Is there any apparent application of school training in the community activities?
96. Is there any apparent application of school training in the community activities?
97. Are statistics compiled to show the comparative cost of maintenance for the department?
98. Do Students' records show regular growth throughout each course?
99. Is the number of products made or the quality of the work done each year sufficient to indicate that the department has maintained a spirit of industrious activity?
100. Can pupils pass a practical examination at the close of each course?

The application of the scheme is made in a manner that insures the most intelligent answer to each question and which leaves an understanding of the entire situation in the minds of those concerned. To this end, the state supervisor, the instructor in charge, and the superintendent of the local school, in conference, go over the list point by point, checking each question either "yes" or "no". The answers are the result of observation when self-evident, and the consummation of discussion and agreement in cases of doubt on the part of any one of the group. The total number of affirmative answers becomes the final score and correspondingly the percentage rating.

After the questions have been answered, the affirmative ones are disregarded. The negative ones are gone over carefully and those eliminated which cannot be changed to the affirmative due to uncontrollable conditions. Those capable of change are discussed and an agreement reached as to the necessary means for bringing about an improvement.

RATING MECHANICAL DRAWING

L. J. Webster, Madison Public Schools, Madison, Wis.

The question of grading or marking drawings seems to have an endless variety of answers. The instructor takes the drawing and carefully looks it over, marking this and adding this correction, or that. But does he really consider the points which should receive the main emphasis? To test this, a group of men, all teachers of drawing or men who had previously taught drawing were asked to list percentage ratings which they would consider fair, allowing the number of points that were seemingly the most important in the teaching of drawing and in the execution of same. The results received were certainly diversified.

In order to construct a scale which would be at least partially satisfactory and in order that teachers of drawing might have some sort of a standardized percentage rating, or common ground, points were listed that were considered or stressed in the texts that are now on the market and a scale was developed. This scale is to be applicable to ninth and tenth grade mechanical drawing in considering the grading of drawings as finished products.

The scale organized is as follows:

Tentative Standards

The points which have been selected as standards through the analyses of the texts now used in the field are:

1. *Selection and placing of views.* Is the correct view chosen for the front? Are all details plainly shown Are views in correct relation to each other?

2. *Lines.* (a) Contrast of lines, i.e., weight of lines according to alphabet of lines. Regularity and uniformity of line formation. (b) Construction of lines with regard to their correct use. (c) Spacing of dimension lines, i.e., distance from drawing. Are they too close or too far away? (d) Extension lines. Distance from object line. Distance line extends from arrowhead. (e) Cross-hatching (spacing of lines and uniform weight).

3. *Dimensioning* (Placing of dimensions with special regard to legibility. Are they uniform, well spaced, and do they read correctly? Proportion and form of arrowheads).

4. *Lettering.* Correct proportion of letters, spacing of letters and words.

5. *Neatness.* Does the drawing present a finished appearance?

6. *Speed.* Does the student complete the drawing in the time allotted to the average student?

Accuracy has been omitted because of the fact that it has been covered adequately in the above standards and therefore cannot be listed separately. Technique has been omitted because standards are desired that can be used in grading drawings as finished products.

The above scale was sent to the heads of mechanical drawing departments in four states, Wisconsin, Michigan, Ohio, and Illinois, covering practically all cities ranging from 15,000 to 50,000. The results were varied in so far as the rating according to percentage was scored. The results of the rating based on the mean or arithmetical average are as follows:

Selection and Placing of Views	25%
Dimensioning	19%
Lining	18%
Lettering	15%
Neatness	14%
Speed	9%
Total Rating	100%

In connection with this scale, a test may be used, either an intelligence test or mechanical drawing test, to discover and classify the student's ability. This may be tested separately and listed to determine the student's ability, initiative, effort, etc. May I state again that the above scale is for grading drawings as finished products and may be coordinated with the test to determine the student's final grade.

THE IMPROVEMENT OF FARM SHOP COURSES

Vocational farm shop courses as a part of vocational agriculture courses have not been making the progress which they should, in the opinion of professor M. A. Sharp of Iowa State College.

In a recent address before the Vocational Education Association of the Middle West, Mr. Sharp called attention to the failure of several cooperating groups who have not appreciated the problem and have, therefore, not put forth the necessary efforts for its solution. The State departments of public instruction, the teacher training colleges, the teachers in the field, and even the Federal Board of Vocational Education are, to a certain extent, all responsible for the situation.

In the State departments and in the teacher training colleges the work of guiding the farm shop activities have been too largely in the hands of academic men who haven't a full appreciation of the situation. Some of the colleges offer only woodworking courses and the men have no knowledge of farm machinery, harness making, or other phases of shop work necessary in the conducting of a farm. The teachers of farm shop work in the field are in some cases agriculturists without specific training for teaching the shop work, and therefore do not know how to organize equipment and supplies and how to offer the variety of work which will hold the interest of the boys. The Federal Board for Vocational Education has not recognized farm shop work in its reports in spite of the fact that one-half of the time and money spent for vocational agriculture goes for work of this type and its value compares favorably with that of home project work.

In Mr. Sharp's opinion the first step toward solving the problem, is to thoroughly understand the aims and purposes of the farm shop courses. He says:

The aims of the farm shop course should be to give the boy such skill, knowledge, and appreciation as are necessary to successfully perform all the shop work on his own farm. Work such as the making of joints and cabinet work should be eliminated, and in place of them there should be substituted projects suited to the small town and consolidated school, involving the construction of hay racks, self-feeders, gates, doors, concrete forms, the erection of small buildings, and miscellaneous repair work to be encountered around the ordinary farm. The instructor should know how to teach the repair of ordinary farm machinery, and should know a good deal about soldering methods, glazing, splicing of rope, elementary plumbing work, possibly some forging, and also general job work requiring some mechanical knowledge and application.

State departments of education, and colleges operating teacher-training departments, should avail themselves of the opportunity to cooperate in laying out shop courses suited to the needs of the farm boy. A comprehensive survey of the work of the farm is necessary as the basis for the work. The course should include all the jobs which the average farmer is compelled to perform in the ordinary run of his farm work, and should offer considerable details, outlined in a manner that the vocational agriculture teacher may follow in laying out a year's work. The work should be standardized in order that the various schools within the state may offer the same general type of work, with courses of identical length and character. Such a standardized course would serve as a reliable guide for the teachers in the work and would eliminate the "hit-and-miss" plan that is found in many of the schools at the present time. The lack of a definite program or outline of the work leaves the teacher without a guide, and is the reason for the present failure to offer the right kind and amount of work, and to properly teach it.

The colleges must rise to their opportunity in providing courses that meet the needs of the vocational agriculture teachers. Such courses should be arranged for prospective students desiring to teach this type of work. The course should be taught by modern methods, and the instructor should be a man with farming experience, as well as a high school education, in order that he may be familiar with the conditions under which the farm shop teachers work. The service of the teacher-training department must be obtained to realize the aims of the farm shop work, and it should be the purpose of the department to see that its prospective teachers obtain sufficient training in their particular line.

The course in methods of teaching should be taught by a man who understands mechanics, methods of teaching, and the conditions which must be met in high school work.

The setting up of standards by which to measure actual accomplishments in the work is perhaps the most difficult part of the problem. Conditions vary so much in the states and also in different parts of the states, that it is hardly possible to work out an actual plan that will be entirely satisfactory in all circumstances and under all conditions. Differences of opinion among administrators and teacher-trainers in the work also make it difficult to work out a satisfactory solution. A tentative plan which has been suggested as a beginning from which to work is here outlined:

1. Determine the approximate per cent of total time that should be given to farm shop work.
2. Determine the number of years of shop work to be offered.
3. Select the types of work that should be given.
4. Limit the year in which each type of work should be offered.
5. Determine the general content of the course in each type.
6. Determine the amount and character of the equipment needed.
7. Indicate the size and arrangement of the ideal shop.
8. Determine the arrangement and character of the benches and equipment.
9. Have each state select a score card or some similar scheme by which each shop may be judged as to the work performed.
10. Publish a list of the schools in the state, ranked according to the score card.
11. Issue a Federal score card under which each state may be ranked according to the work accomplished.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

POCKET SLIDE CALIPER

Albert J. Pfau, Shop Foreman, Winship School, Boston, Mass.

(See Supplement No. 19)

The supplement drawing shows a pocket slide caliper, so designed that its construction is not beyond the abilities of the junior high school boy. This project is well adapted for the machine shop where the machine equipment is limited to perhaps four or five engine lathes, a small shaper, a sensitive drill, and a milling machine.

The tool, as seen after a little study of the sketch, makes a very suitable bench job, as the greater part of it can be made with a hack saw and various types of hand files. Still, there is enough machine work on the tool to relieve the monotony of too much filing and laying out, which must be accurately executed on a tool of this type.

Construction: The sliding blade A is just roughed out with a hack saw and finished to the given dimensions with a file, using a square and straight edge for the required accuracy. Pieces B, C, and D are then squared on one end only, allowing a little on the length for finishing. The pieces are then filed to form the level, and laid out for drilling. Pieces A, C, and D are then held in position by means of parallel clamps on piece B, which serves as a back. The holes are now drilled with a No. 30 drill, and countersunk on both sides in order that the 1/8" rivets may be headed over and filed until they cannot be seen. The sliding blade A can be graduated on either a milling machine or shaper, and the marking of the blade offers a splendid opportunity for correlation with the mathematics teacher, through the medium of common fractions. Graduating the blade into one-sixteenth inches will be found to be fine enough for boys of junior high school age.

The small thumb screw E is made on a lathe, using a forming tool for the head. By cutting the threads with a tap and die, the boy is given some valuable experience with these small tools.

The tool is then assembled and put in either a shaper or milling machine, by which a light chip is taken off the edges for finishing.

When the tool is finished and polished nicely, it creates in the boy the desire to measure everything in the shop.

CONSOLE CABINET

R. O. Buck, Chicago, Ill.

(See Supplement No. 17)

The console type cabinet is one of the developments of the radio industry and has proved justly popular.

The cabinet at the center is designed for a 7"x20" panel which is large enough for a four-tube outfit such as the popular reflex sets. The left-hand cabinet is large enough to hold a storage battery and the necessary "B" batteries if a shelf is put in at the proper height. The right-hand cabinet is shown with the door open so that the grill is visible. A commercial type speaker may be set in the cabinet, or a speaker can be built into the cabinet. The back of the grill is usually covered with colored silk.

If the turned stretcher is too long for your lathe it can be made in two pieces, joined at the center by dowells and holes in the center ball. By this method you can avoid the trouble caused by the work "chattering".

Bill of Materials for Console Cabinet

1—Top	¾"x15¼"x3' 6½"	Moulding on three edges
4—Legs	1¼"x 1¼"x2' 5¼"	Turned
2—Rails	¾"x 1½"x1' 1½"	(¾" on each end)
2—Base pieces	¾"x10 "x1' 2½"	(Three edges formed)
1—Bottom	¾"x14½"x1' 9 "	
4—Door rails	¾"x 1¼"x1' 3 "	
2—Door rails	¾"x 1½"x 6½"	(½" tenon on each end)
2—Door rails	¾"x 1½"x 6½"	(½" tenon on each end)
2—Door panels	¼"x 6 "x1' 0¼"	
2—Raised panels	½"x 3½"x 8 "	Quarter round edges
1—Lid	¾"x 7½"x1' 9 "	With moulding
2—Side panels	⅜"x12¾"x1' 3½"	
2—Back panels	⅜"x 8¾"x1' 3½"	
1—Back panel	⅜"x 7¼"x1' 9¾"	
2—Inside panels	¾"x14½"x1' 3⅜"	
2—Brackets	¾"x 6 "x 6 "	
1—Rail	⅜"x ⅜"x3' 3¼"	
1—Back rail	¾"x 1¼"x3' 3¼"	
4—Door jambs	¼"x ½"x1' 3 "	
2—Door jambs	¼"x ½"x 8 "	
2—Door jambs	¼"x ½"x 7½"	
1—Door jamb	¼"x ½"x1' 9 "	
1—Shelf	¾"x 8 "x1' 0 "	
2—Rails	¾"x 1 "x1' 1⅛"	
1—Stretcher	1⅛"x 1⅛"x3' 4 "	Turned, ½" tenons

WASTE BASKET

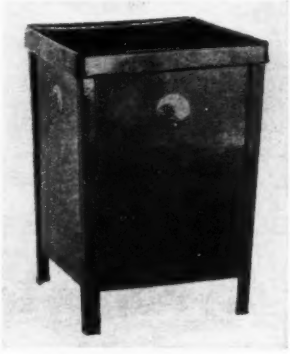
John B. Butler

(See Supplement No. 20)

Material 26 or 28 g. Iron (galvanized or black).

A. **Sides.**
1. Mark carefully around pattern with scriber.
2. Cut out four pieces.
3. Set bar-folder at ½" closed lock and fold sides and bottom of pieces. (See drawing.)
4. Set bar-folder at ¼" open-lock and fold for wire top. (See drawing.)
5. Cut piece of ⅛" wire 12" long and lock metal around it—using wiring machine if possible. Repeat this operation for other sides.
6. Place upper end of side over edge of bench and fold by hand to form rim. (Do not use mallet, as metal will take proper shape by careful handling.)
7. Pull out straight piece of wire.

Show to Instructor for Inspection.



WASTE BASKET.

B. **Bottom.**
8. Mark carefully around pattern with scriber.
9. Cut out one piece and with bar-folder set ⅛" closed lock, fold all sides at right-angles.
10. **Show to Instructor for Inspection.**

C. **Legs.**
11. Mark carefully around pattern with scriber and cut out four pieces.
12. Set bar-folder ¼" closed lock and fold bottom of leg.
13. Set bar-folder 1/16" closed lock and fold sides of leg.
14. Set bar-folder 1/16" closed lock and crease leg in center in the shape of a right-angle.

D. **Corner Wires.**
15. Cut four pieces ⅛" wire 8" long.
16. Bend at right-angles in center. (Use vise.)

E. **Assembling.**
17. With screw-driver open inside fold on upper end of legs.

18. Do likewise with bottom corner of fold on sides.
19. Place corner wires in position.
20. Slide on legs, one at a time until the lower edge or rim is reached.
21. Lay on bench, bottom up—and drive down legs as far as they will go.
22. Insert bottom and tighten fold with hand seamer.
23. Prick-punch bottom and legs in place on inside surfaces.
24. Final Inspection.

Note—Bottom may be secured if desired, by riveting through fold, using escutcheon pins, having two on each side.

THE PRISCILLA ALDEN SEWING CABINET

Anton Anderson and Alan H. Nicol, Technical High School, Buffalo, N. Y.

The Priscilla Alden sewing cabinet is one of the few pieces of furniture designed by American colonial masters which has retained its popularity through the intervening years. Although the time and place of its origin is disputed by various authorities it has a touch of the early English in its makeup.

In spite of the bickerings concerning its origin, it has withstood the onslaught of the various period styles and has adapted itself to the twentieth century mode of living. It lends itself to the modern type of interior decoration being especially adaptable to the mahogany and white type which is so much in vogue at present. Its utilitarian value, in combination with its delicate and harmonious lines, makes it one of the most sought after and admired pieces of furniture.

In the early days the sewing cabinet was found in almost any room in the mansions, and even out on the spacious piazzas, or among the trees and flowers of the beautiful gardens on the large estates. In the garden it harmonized perfectly with the beauty of its environment and the perfection of the delicate needle work done by the ladies of the day who were masters of that art. The Priscilla Alden is the result of a desire to make the sewing circles of colonial days complete in every detail.

The design is a vast improvement over the old straight-line type of Priscilla Alden we have been accustomed to. The capacity is greater. The curved lines of the handle, the feet, and the bottoms of the sides are in harmony and blend with the pleasing lines of the turnings. Cabinets featuring these improvements are not to be found on the commercial market today.

The Priscilla Alden cabinet is usually made of the better classes of woods because it is one of the aristocratic members of the furniture family and associates with the best in furniture circles. Because of its lightness of weight, fragility of construction, and its ability to take a soft, pleasing finish, mahogany is preferred to American walnut in the construction.

In making a cabinet of this sort it is necessary for the worker to make a full-size detailed drawing so that the various patterns may be made and used properly in facilitating the laying out and cutting of the curved parts.

The full sectional view of the drawing should be laid out first as shown in the accompanying drawing. A center line may be used if the worker desires, and only the left side drawn. This eliminates half of the work and saves some time. The cross-sectioned parts show the type of construction used. The drawings in the upper part of the cabinet show the sliding tray which is used as the utility box to receive the smaller paraphernalia used in sewing.

After completing the sectional view the worker finds the drawing of the front view simple. By transferring the lines across the paper he greatly reduces the possible number of mistakes in measurement and the proper locating of parts. The repetition of the drawing of the turning is unnecessary. The outlines of handle, side and stretcher should be made complete, as these are essential to the making of quarter-inch veneer patterns. Working from the center line aids in correctly determining the length of various parts.

The bill of material is used as an aid in interpreting the drawing by comparing the names and sizes of the various parts with the corresponding parts in the drawing. It will be noted that finished sizes are specified in the bill. The layout of it and the items covered, such as the names of parts and the number of pieces, simplify the work considerably for the amateur worker. In industry the bill of material is used as a definite guide for the operators of the planer, surfacer and mitre saw machines. In item number one, for instance, the worker will note at once just what he must do to reduce a part to the proper size as specified.

The detail drawing of the foot shows how the pattern should be placed on the 8″x3″x⅝″ piece of stock in order that it may retain the greatest possible strength. The lightness and fragility of the various parts of a cabinet of this sort make it an advanced project of the first class.

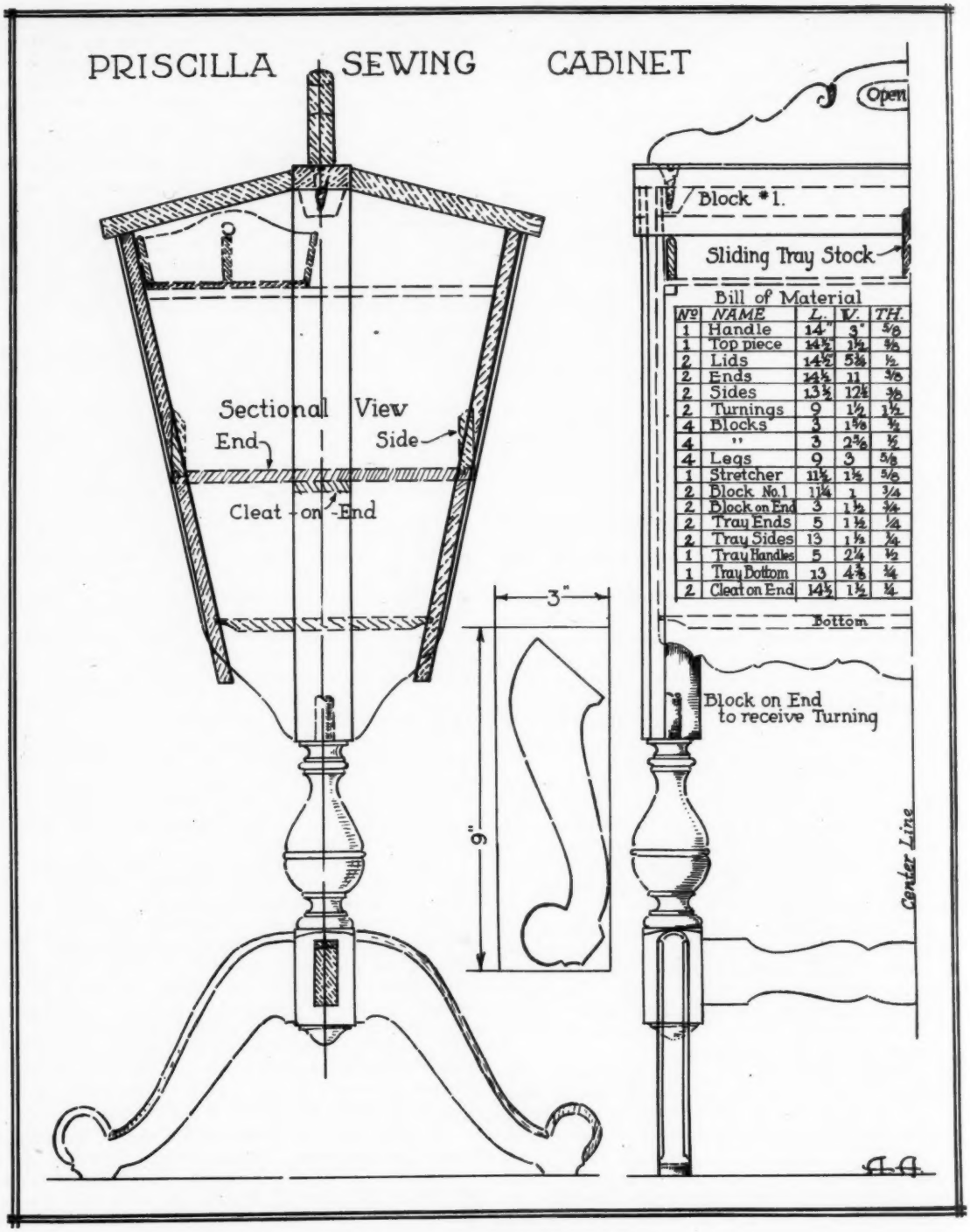
To begin with, the various pieces should be cut out roughly, beginning with the largest pieces, then working in the smaller pieces later on. One inch is allowed on the length and one-quarter inch on the width of all pieces cut. To economize in material and to match the grain, one inch material is re-sawed, jointed and glued together for the sides and ends. When pieces are cut, they should be marked properly and checked on the bill of material to eliminate the repetition of cutting again. After all of the pieces have been sawed out roughly and dressed to thickness, they may be cut to the finished dimensions, or to the shape of the pattern. The tongue on the sides and the grooves in the ends should be cut before any band-sawing of curved lines is undertaken.

After the feet and handles are cut to pattern they should be shaped to suit the taste of the worker. This may be accomplished with the aid of the shaper, or a one-half round bastard file. All pieces should be scraped and sanded smooth on both sides because the inside as well the outside receives a finish.

The 3/16″ strip should be applied to the outside of the ends. The block to receive the turnings and the one-inch block on the inside of the side at the top may be glued in place at the same time. The lower block is rounded off to harmonize with the upper part of the turning. The holes, ½″ in diameter, are bored to receive the round tenon, which is a part of the turning and not a dowell added to it. Two ⅜″ dowells hold the feet to the bottom part of turning. These are glued in place with the aid of forms band-sawed to fit the curve of the foot and tacked in place where the pressure is to be applied. The stretcher is bored to receive dowells and holes are bored in the turnings to receive the dowells of the stretcher.

All parts are now assembled for testing for proper fitting and squareness. Blocks should be used so that the clamps will not mar the wood. Care must be taken in applying the pressure so that the sides will not be cracked. Use light weight clamps, if possible. This preliminary assembling prepares the worker for the final assembling after the glue has been applied.

If the fitting is correct the parts should be warmed thoroughly before the glue is applied evenly to tongue and grooves and the clamps put back in place. Here one of the greatest difficulties is encountered because the project must be tested carefully for general levelness, squareness, and out of wind. A machine table, or an even bench top, should be used to work on when the final assembling is being done. The floor of the shop should not be trusted, as it is likely to be uneven. The cabinet should remain in the clamps from six to twelve hours to



№	NAME	L.	W.	TH.
1	Handle	14"	3"	5/8
1	Top piece	14½	1½	⅝
2	Lids	14½	5⅜	½
2	Ends	14½	11	⅜
2	Sides	13½	12⅛	⅜
2	Turnings	9	1½	1½
4	Blocks	3	1⅝	½
4	"	3	2⅜	½
4	Legs	9	3	⅝
1	Stretcher	11½	1½	⅝
2	Block No.1	1¼	1	¾
2	Block on End	3	1½	¾
2	Tray Ends	5	1½	¼
2	Tray Sides	13	1½	¼
1	Tray Handles	5	2¼	½
1	Tray Bottom	13	4⅜	¼
2	Cleat on End	14½	1½	¼

DETAILS OF PRISCILLA SEWING CABINET.

allow the glue to dry thoroughly. The handle may now be applied to the top piece and this piece fastened in place with glue and screws as shown in the drawing. The lids may be planed to the proper bevel to join the top piece. Two one-by-one-inch brass butts are cut in full depth in lids about two inches from the ends. To avoid the splitting of the thin pieces, holes should be bored and the screws waxed before being inserted in place.

The measurements for the tray may be taken and the tray made of one-quarter inch material. The butt or tongue-and-grooved joint may be used. The bottom may be of three-ply or solid material. The parts are nailed and glued together. The strips upon which the tray slides should be applied to the inside of the ends low enough to allow the tray to be pushed from side to side. A set of quarter-inch domes of silence is applied to the feet. After a recleaning of the entire project with double "O" sandpaper and scraper, it is ready to receive the finish.

If it is made of mahogany, white wood, or any of the other soft woods, it should be sponged thoroughly with

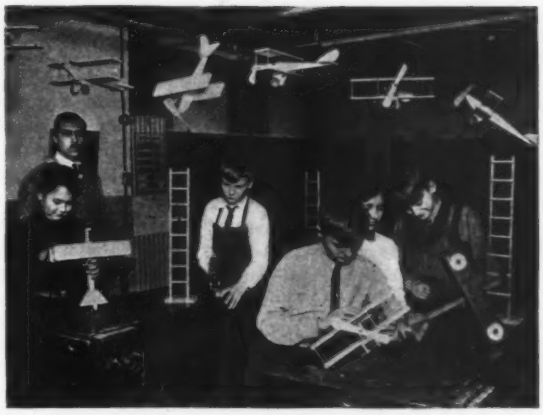
cold water to raise the grain and then allowed to dry thoroughly. The raised condition of the grain should be removed with a triple "O" sandpaper and a coat of oil or acid stain applied inside as well as outside. After drying, a coat of good grade of filler should be put on the outside of the cabinet and inside of the lids and rubbed off in the usual manner. The shellac is now applied inside and outside. Finally two or three coats of a good rubbing varnish are used. Care should be taken to allow each application to dry thoroughly and to see that each coat is sanded and dusted off well. The last coat should have from three to five days to dry before being rubbed with a felt pad, a medium grade of pumice stone and crude oil. This must be wiped off as the oil will soften varnish and hold dust particles. Rubbing should always be done with the grain to eliminate the possibility of scratches. The cabinet is now finished and ready for use.

TOY AIRPLANE

Jos. J. Lukowitz, Milwaukee, Wis.

The recent airplane controversy has apparently been settled to the satisfaction of all concerned judging from this fleet of airplanes and others too great in number to appear in the picture. The boys feel that Colonel Mitchell would be gratified were he to see such a fleet of airplanes ready to respond to the throttle and sail away to the defense of their country. Everyone of these planes has made several flights and has flown at break-neck speed in the colorful imagination of the boys.

This is a project typical of the interests of youth and one which has proven successful in sixth-grade shop work. It furnishes a fine outlet for the constructive tendencies of boys of this age for we must remember that it is a good principle of education to base all learning, whether it be mental or manual, upon interest or instinct. If there is any teacher who has not relegated the old time-honored courses to antiquity, let him do so and try this and similar up-to-date problems.



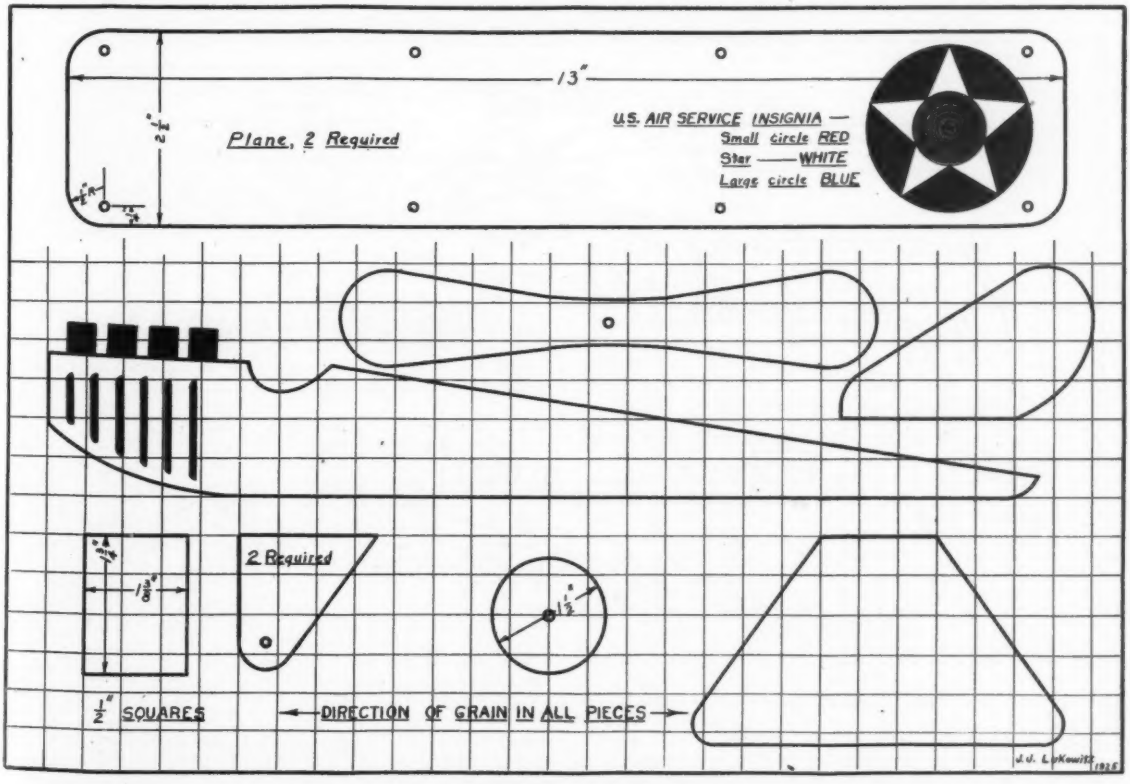
A FEW OF THE AUTHOR'S STUDENTS AND THEIR PLANES.

Rightly conducted or presented, almost any problem has educational value and if the principles of modern education are followed it is even as the poet said, "There are books in running brooks, sermons in stones and good in everything."

Construction Details

The stock required for the airplane is 5/16" basswood for all parts excepting the fuselage and the propeller, which are made of 13/16" basswood. Rattan is used for the struts. It is more satisfactory than wood for this purpose because it is more flexible and not so easily broken. The rattan should be at least 3/16" in diameter.

It is well to brad the two planes together after they are roughed out and bring them to size together. Next, lay out the holes for the rattan and bore the holes through both pieces at the same time. At this point an identification mark should be made on the edge of the planes—



DETAILS OF TOY AIRPLANE.

a small triangle is suitable—and then they should be pulled apart for surfacing and sanding. Place them together without the brads, being sure the triangle matches, and insert the rattan into the holes just through both pieces. Then drive a small brad through the edge of the lower plane into each strut, and carefully slide the other plane up until the distance between the planes is 2½". Fasten upper plane in exactly same manner as the lower and cut off any protruding rattan.

The rudder is glued and bradded to the elevator and then these two members are fastened to the tail end of the fuselage by three brads, first one from the bottom of the fuselage into the elevator and the attached rudder, thus pivoting the entire tail-piece. This is an opportunity to point out the use of the oft neglected square in assembling. By placing the square against the fuselage and sliding it up to the tail, the boy will see the entire tail-piece swing into alignment and there is every chance for him to appreciate the importance of the use of this tool in assembling a job. Two brads from the top hold the tail securely in place. The wings may be nailed on next and then the landing gear.

The engine consists of four pieces of ⅜" dowell rod ⅜" long, glued or held in position by brads. The propeller turns on a copper pin with two copper burrs. Care should be taken in cutting the propeller that the blades are not made to oppose each other for it will not turn if cut in this way. The propeller, if properly cut and balanced, will be turned by a slight breeze, thus animating the toy and giving it a businesslike expression.

"C" CLAMP

H. D. Campbell, Cicero, Illinois

The pattern and cabinet-making shops of the Sterling Morton High School, Cicero, recently requisitioned the writer's shop for drawings of a deep-reach clamp which would not bend.

The accompanying drawing illustrated a clamp opening 4" and with a reach of 4" which should prove amply strong.

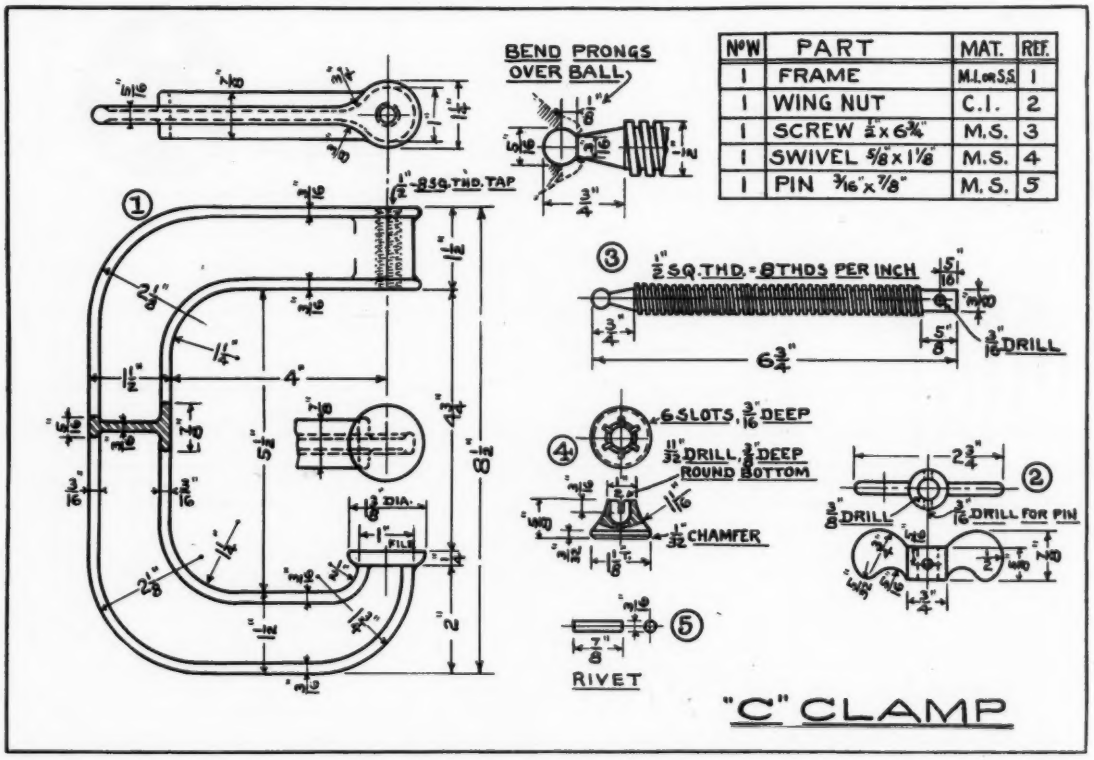
Not counting labor charges, it can be made for between 20 and 25 cents, which is considerably less than the commercial price.

In addition, it furnishes a very interesting and practical problem to the machine shop in square thread cutting, with a minimum of other machine operations.

CARVED WASTE BASKET.

A CARVED WASTE BASKET

The waste basket above was made by a student in the Austen Riggs Foundation at Stockbridge, Mass. The carving was done by a boy in the class of Mr. A. E. Gray. The boy had no previous experience or training in carving.



No W	PART	MAT.	REF.
1	FRAME	M.I. or S.S.	1
1	WING NUT	C.I.	2
1	SCREW ¼"x6¾"	M.S.	3
1	SWIVEL ⅝"x1⅛"	M.S.	4
1	PIN 3/16"x⅞"	M.S.	5

DETAILS OF A USEFUL SHOP CLAMP.

Some Reflections on the Des Moines Convention

E. J. Lake

The thirty-second convention of the Western Arts Association and perhaps the final session of the Vocational Education Association of the Middle West proved to be a splendid combination of industrial art interests for all that attended.

The only unfortunate reflection was the improbability of these organizations getting together for a second convention. The Vocational Education Association of the Middle West will now join forces with their national organization and a second joint meeting with the Western Arts Association may not be feasible.

No time or place for the next meeting of the Western Arts Association was decided upon, though several urgent invitations were presented, and it was thought best by the directors to defer their decision until a later date and if possible have a second joint session with the vocational educators should their next meeting be held in a mid-western city.

Des Moines entertained the Western Arts Association in 1913.

The city and the organization have grown almost out of recognition in those thirteen years. A bigger, better city entertained a bigger, better Association in a bigger, better way.

The program was too extensive for any one person to get more than a general impression and an occasional definite conception of especial importance. Nine distinct specialties in the industrial art field of school activity held special round table sessions. Art, Home Economics, Printing, Manual Arts, Argiculture, Apprentice Training, Industrial Education, Commercial Education and Vocational Guidance each had special meetings at which their particular problems and interests were discussed.

In addition to these meetings, the general sessions and various entertainments, sectional luncheons and side trips to schools and art interests made up a busy week.

The program was replete with leaders in industrial arts education.

The interests of vocational education were voiced by Edwin A. Lee, president, American Vocational Association; Charles A. Prosser, director of Dunwoody Institute; J. E. Evans, Division of Industrial Science, Iowa State College; L. A. Hartley, director of Education, The National Founders Association; R. L. Cooley, director of the Milwaukee Vocational School; L. H. Dennis, assistant state superintendent of schools of Pennsylvania; F. E. Searle, superintendent of the Ford School of Detroit; Lloyd Harrington, Typographical Union, Des Moines; Rodney Brandon, director of Boys' Training School, Mooseheart, Illinois; Lewis Gustafson, superintendent of David Rankin Junior School of Mechanical Trades, St. Louis; A. H. Edgerton, chairman, Department of Industrial Education and Applied Arts, University of Wisconsin; Dr. Walter B. Martin, psychiatrist, Department of Public Welfare, State of Illinois; E. W. Barnhardt, Federal Board for Vocational Education, Washington.

I fear some important names have been omitted and only a careful review of the program will insure a complete list. No one person could take advantage of such a program in addition to the splendid program of the Western Arts Association which was presented by authorities in their line.

Mr. Royal Bailey Farnum stressed the practical values of art instruction in a series of addresses and discussions. Mr. Farnum has had personal experiences and has first hand knowledge of the beneficial results of art upon the industries of New England.

As president of the Federated Council on Art Education, Mr. Farnum explained the operations and functions of the council which is composed of representatives from seven leading organizations of the country devoted to art education.

This council originated with the Western Arts Association and therefore represents in a particular sense the interests of mid-western teachers of art toward the standardization and establishment of successful art education. Mr. Farnum succeeded in giving confidence to the teachers as to the council and the president of the council.

Significant addresses that reflected intimate experience with plans and methods of art teaching in the public schools and which were of particular value to the teachers were given by Miss Elizabeth Hall, Assistant Superintendent of Schools, Minneapolis; Ruth Raymond, Associate Professor of Art Education, University of Minnesota; Harry Wood, Director of Vocational Education, Indianapolis; Beulah I. Coon, University of Nebraska and numerous other disciples of the beautiful and the useful.

MR. ELMER W. CHRISTY, President, Western Arts Association, Supervisor of Industrial Arts, Cincinnati, O.

Mr. Christy was a teacher of patternmaking in the Woodward High School of Cincinnati for four years. He resigned in 1912 to accept the position of Director of Industrial Arts, succeeding Mr. Frank Ball. Following his graduation from high school, he served an apprenticeship in the patternmaking trade and was employed for fifteen years. He completed a course at the University of Michigan and is a graduate of the Ohio Normal College of Miami University. In 1919 he was associated with Prof. R. W. Selvidge in the development of vocational schools for the U. S. Army, and participated in the preparation of a number of trade manuals.

A meeting that impressed Manual Arts teachers in a particular way and gave them renewed purpose in their work was the Industrial Education Dinner Conference held under the auspices of United States Bureau of Education and under the leadership of M. M. Proffitt, Specialist in Industrial Education.

At this meeting the values to be derived from manual arts, the 1926 viewpoint, were discussed from the viewpoint of the school administrator by Wm. J. Bogan of Chicago; from the viewpoint of the educational philosopher by Charles A. Bennett; from the viewpoint of a National Program for Vocational Education, by Frank Cushman, Federal Board for Vocational Education; from the viewpoint of the Teacher-Trainer, by W. H. Lancelot, Iowa State Teachers' College.

The exhibition of public school work in art and of art schools was well placed on the third floor of the Hotel Ft. Des Moines.

Cities of the middle west were represented in majority and were supplemented by exhibitions of work from Texas, Pennsylvania and the western states.

The illustrative work of the lower grades was not shown in great quantity but was excellent in pictorial and poster composition executed in paper cutting and in crayons. The design of the upper grades and high schools was superior to previous exhibitions in simplicity and harmony of forms and colors. There was little of the detailed, fussy rendering and copied decorations of past shows. The arts are gradually finding place in education and will eventually find a place in all of our schools.

Leading professional and normal art schools gave evidence of logical pedagogical courses of study. Our teachers are in process of development.

The Western Arts Association elected to office for 1927 as follows:

President: Elmer W. Christy of Cincinnati, Ohio.
Vice President: Ann V. Horton of Cleveland, Ohio.
Auditor: Professor Whitford, University of Chicago.
Council: Harriet M. Cantrall, Springfield Illinois.

VOCATIONAL EDUCATION SOCIETY OF BOSTON

The regular monthly luncheon meeting of the Boston society was held Saturday, March 13, at Cook's Restaurant, Boylston Street. After the transaction of routine business, President Baker felicitously introduced the speaker, Mr. Robert O. Small, director of vocational education for the State of Massachusetts. Mr. Small, who is deeply interested in the Society and its aims, and who has official relations with many of its members, has addressed the organization on two other occasions during its existence. The inspiration which his words always bring set up an anticipation which resulted in a record attendance.

Mr. Small's address in large part follows:

WORK—A FACTOR IN THE EDUCATION OF MINORS

My topic is phrased "Work—A Factor in the Education of Minors." I shall treat it positively. Work has ever been the most important factor in the real education of minors: manual work, mental work, cellular work.

If I were asked what is the greatest thing about life I should answer: The eternal will to live and to develop! And then I should point out the fact that this is accomplished by work. Work! That is the vital thing; the greatest thing about life. Except ye work, ye die: physically, mentally, morally.

Three Educational Stages

In its development educational practice has shown three distinct manifestations:

First, that of scientifically organized subject matter: ten thousand words in spelling (ornithorhynchus); useless arithmetic (compound proportion); place geography, (Timbuctoo); date and place of history, (Battle of Chapultepec). Throughout this stage many a child dislikes school.

Second, that when the fundamental aims of schools are dominantly based upon the needs of the state. In this stage much dead material is eliminated and help is given. In it, however, the state rather than the individual is emphasized. Ancient Sparta's scheme and modern Germany's program exemplify it fully.

Lastly, that stage in which the nature and needs of the individual become prominent. In its training for a democracy Athens passed through this stage centuries ago: apparently we are entering it.

In these manifestations manual work has been variously associated with organized education. At times entirely ignored or again assigned a place in the organized programs for education of the nation, it has played a part.

Child Labor

Often, and recently, we have had the question of the control of the right and the need of children to work vigorously debated. In those debates much careful, thoughtful, and unselfish discussion has been had, but also much loose, sentimental and self-interested opinion has been indulged in. In them very little is said about the functioning of work as an educational factor. Too often such debates are very much of a "'tis and 'taint, it will and it won't, you will be damned if you do and you will be damned if you don't" argument.

Upon this subject the body politic and impolitic divides itself into three major groups somewhat as follows:

A First Group.—Those who believe in a strong paternalistic government: described by opponents as a bureaucratic oligarchy accomplishing its ends through restrictive legislation. In this group are found many reformers and those educators who consider as exploitation all labor which takes the child out of school for monetary profit. By their extreme program all children would be kept out of industry to pursue full time academic education during their "plastic formative years"—up to 14, 16, 18 years of age. The world's work must not interfere with this prime necessity of all youth. This group would further prohibit child labor.

A Second Group.—Those who believe less in a strong paternalistic government, especially when it coincides least with what they deem important. In this group are found self-interested employers, state's rights advocates who fear encroachment upon self-government, and certain educators who declare that work may be education, and working habits must be formed in early plastic years if formed at all. This group has no commonly accepted program as to child labor.

A Third Group.—The great majority of plain Mr. and Mrs. Citizens with or without children to bring up. They want to do the right thing, but do not want to be bothered to think much about what that thing is. They are willing "to come across" for the fellow who makes his point and in whom they believe, and trust to luck and an "open winter" that things will come out well in the spring or early summer of their children's lives.

Evidently the main factors in this question are seldom associated in the argument. What are they? In last analysis the factors in the problem are these: (a) the child, (b) work, (c) the relationship of one to the other. By work I mean action and reaction; directed manual labor (skilled or unskilled); mental labor; or natural phenomena.

In taking a position upon the question relative to our youth, these are some of the questions which need to be asked and answered.

Is training in work habits necessary? Should this training come in school? Does our present elementary, high school, or any other school system provide for this? Should it be provided for outside of school? When does work become exploitation? In relation thereto what bearing has age? Should it be drawn at an absolute point for boys? For girls? At the same place for all boys and girls?

To whom shall we turn for answers to these questions?

To the employers? They have a pecuniary self-interest.

To the parents? They have a personal and pecuniary self-interest.

To professional partisan advocates who have fine altruistic motives? Many of them have little first-hand knowledge of manual work in general or of the work children perform in industry. They themselves never did any manual work and never intend to, if they see it first.

To the educators? They constitute the most hopeful group, but at present you will find them on all sides of this question.

I should not turn to any one of these groups exclusively. I should turn to all of them. I should seek people of feeling and sense, who from long experience and intimate contact know three things: children, industry, and children in industry. I should try to find them wherever they may be and listen to them.

But before I did this I would turn to and study the part which work has played in life, in the development of men, and their institutions, in the educational practices and contributions of the great civilizations upon this earth. I should commence with primitive life itself.

Let us turn now to the nations of history, scan briefly their educational policy, and note any significant permanent development or contribution. I will commence with the most primitive.

Education and Work: National Attitudes

Education in Mexico. The children of the common people and those of the higher classes among the Toltecs did not attend in the same buildings. Both classes were taught such things as belonged to their stations in life—the boys of the common people, the heavier and more menial work; the young nobles, the higher duties. Work played its part but for class education. Class education has given us nothing.

Education in Peru. Education among the ancient Aztecs of Peru was wholly reserved for the nobility. It was the theory that the masses were only children and must be treated as such.

The youth of the nobility were placed under "wise men." The youth were trained for the especial kind of duties they were to perform in after life but always for their class. Class education and its contribution to us: nothing.

Education in India. The Brahmins themselves received the highest education possible: memorizing books, philosophy and science. The second and third castes were accorded the right to study what the first caste did, but the third caste received a somewhat meagre education. Boys followed the occupation of their parents. They received such elementary instruction as was needed in the trade or work to be performed. The fourth caste received no training except in the duties which a servant was expected to perform. Class education: its contribution to democracy: nothing.

Education in China. Chinese education appears to fulfill the saying—Educate a boy and he won't work. "The scholar is not a utensil" (a Confucian saying). We turn to China for very little of our inheritance.

Education in Egypt. Here at the beginning there seems to have been no caste whatever. The poor boy and son of one of the lower classes could take his place in school by the side of the rich boy or the son of the noble.

The purpose of education in ancient Egypt was to prepare for some of the callings of priest, scribe, architect, engineer, physician, soldier, musician, artisan. The education was of a utilitarian nature. Education gave Egypt a high place among the old nations of the world and caused its civilization and influence to continue through many centuries even down to this day.

With prosperity she changed her scheme of education and its aims. Where is she today?

Education in Japan. The Japanese children were taught to work. The girl was instructed in household duties and the care of children. The apprenticeship system was used in Japan. Akin to this was the entering of boys into the homes of those of distinction and education. Children of both sexes and of all ranks attended the lower schools and those of higher rank went on into schools of a higher grade.

Possibly modern Japan and the reasons for her place among the nations of the world today are thus accounted for.

Education in Judea. The education of the Hebrew child began at a very early age. All pupils were obliged to learn a trade. Higher training was given only to the upper classes. The honoring of God and parents, the memory of a great history, and the practical wisdom of proverbs constituted the elements of the education of the masses. This can be no better stated than it is in the sixth chapter of Deuteronomy: "Hear, O Israel: The Lord our God is one Lord. Thou shalt love the Lord thy God with thy whole heart, and with thy whole soul, and with thy whole strength. . . . And these words which I command thee this day, shall be in thy heart. And thou shalt tell them to thy children. . ." A mixture of practical and class education. But Judea gave us our religion.

Education in Greece. In Sparta the purpose was to help the boy become a man wise and eloquent in council and strong and courageous in battle. All the education was at public cost; in common there was very little intellectual training; everybody worked; they worked for the State; Spartan education produced

warriors and patriots; it did not bring out individuality.

In Athens the individual took prominence; the state was considered as being composed of individuals to be educated for peace as well as for war. There was no such thing as school education of girls in Athens. All the boys received elementary instruction in reading, writing, and arithmetic, physical training, dancing and music. Education was to train the boy to use his body in his work or play with ease and grace and to increase his intelligence. When he was twenty years of age, he was called to Athens and examined for citizenship. In this work played a great part. Greece gave us art, poetry and literature.

Education in Rome. Education in Rome was first wholly of a practical nature. Its aim was to prepare its young that in manhood they might be of most service to the state. Later this was supplemented by literary and class education. Ancient Rome gave us law.

Education in Earlier and Medieval Europe. There arose during the Middle Ages a belief that every child should be trained to do something. One of the marked characteristics of the Middle Ages was the steady growth of the idea of education for all classes. Education arose in this period in three ways: First, through the education for knighthood. It was the custom for boys of the upper classes to be sent into the homes of nobles and churchmen to serve a number of years in order to become learned in chivalry and to acquire the use of arms. Second, the burgher school appeared through the growing importance of cities and their establishment for the training of the city youth. Third, under the guild system there arose a sort of industrial education. There grew up for the boys of the common classes the apprenticeship system, whereby they were placed under a master to spend a number of years to learn a trade or to carry on agriculture. The term of apprenticeship varied: in France, three to thirteen years; in England, seven years.

From Anglo-Saxon Europe came our inheritance of a constitutional democracy.

Education in America. I turn to those early days. Necessity ruled—absolute necessity; work came first; schooling, desirable if it could be contrived, came second. Work was the law of life to which all were subject: man, woman and child. Children learned early to do their share; the habit of work was fixed. Many of them got too much work. Many never got anything but work, but work and work habits were the solid bases of life upon which was built a super-structure of education.

Pick up the biography of almost any great American; he was at work at 11 or 12. Toughened, disciplined by work, to him confidence and mastery came through actual experience. It was work—not slavery. It made men and women just as the lack of it makes jelly-fish and floaters. It developed backbone as well as wish-bone.

Certain Deductions

What have I learned from this survey? It is this: the pronouncement with which I started—down through all the history of successive and successful civilization, runs this saving "urge," the eternal "life principle;" the will to do, to work, to develop. The nation that has ignored work as an educative factor has failed to function fully or perished. Democracy has neither developed nor survived without this recognition.

At times this recognition of work comes first in the conscious effort and organized education. At times it is all but lost sight of in the educational schemes but ever it is the obscured factor upon which the success of all enterprise turns. Just now in the present age academic education appears to come first; it is compulsory. In thinking about education work and training in work habits come second. There is little or no organized program to develop their coming at all. Too often, work and the necessity for work are today thought of as misfortunes—the penalty of poverty. And yet more people are eagerly, willingly, and contentedly, though perhaps questioningly, working today than ever before in the history of the world.

From the recorded history of these civilizations I glean the following summary of facts regarding work historically as a factor in the education of minors:

Summary of Facts

1. Historically, work does not uniformly injure or enslave. The world's work has always to be done. Too much work will enslave, but properly adapted it educates and saves.

2. Historically, children love to work. It is a normal, natural instinct manifesting itself in the child at about 12 years of age.

3. Historically, there is ample evidence that this instinct must be cultivated during the formative years when work habits are formed, or it will atrophy and die.

4. Historically, the educational tendency is away from work. The denial to youth of the opportunity to work is basically wrong. Safeguards to prevent exploitation are necessary; there should be no compromise with it when it exists. But historically, employers are not slave-driving exploiters of young workers.

5. It is the present job of society to assist the educator to teach our youth both how to live and how to make a living.

Let us ask ourselves whether in our eagerness not to deprive the youth of their birthright of education we have not robbed them of that other birthright—their right to know how to earn a living? Have we stifled rather than developed that natural normal instinct of children—the instinct to work?

In addition to and in confirmation of those facts which I glean from history, I also learn other facts from contemporary authorities who know the three things I enumerated; the child, industry, and the child in industry.

1. Play work of school (whether in a manual training department or an industrial school) cannot take the place of real work.

2. Industry, business, the needs of the world, exact recognition of certain work standards up to which our youth should learn to measure at an earlier age than most of us seem willing to admit.

3. They should work for pay or for the equivalent: the pay envelope may be made to teach surely and quickly sound lessons of character and citizenship.

4. The idea that by setting a child to suitable labor you thereby necessarily deprive him of an education is wrong. For some this may be the open door to an education. Up against reality they see things differently. Work does not dull—it sharpens the faculties. In many cases it is the spur needed; it saves the wasting of time in idleness.

In this third educational stage (the stage of the development of the individual) we must give adequate attention to these facts. We must not measure everything, even intelligence, with an academic yardstick. There are doers and makers who do not return a complete answer when thus tested.

Conclusions

Let me conclude. With Dr. Jacks, we may indeed insist, "if 'truth, beauty, and goodness,' or whatever else be the eternal values, are to be effectively at home in a working world, they must be lodged in its work.

"If that is false, little else can be true, if that is ugly, little else can be beautiful; if that is evil, little else can be good.

"For work, in an industrial community, is at least three-fourths of life, and there is no prospect that the proportion will diminish."

Hence: "All attempts to find culture, religion, salvation for a working world outside the sphere of its work must, from the nature of the matter, resolve themselves ultimately into spoken nothings."

"Derision for the man who smells of honest sweat is poor taste. It speaks of class distinction. It is not American." Carry it to its conclusion and the apparent danger of the formation of a peasant class in America becomes a reality. To deodorize our workmen as to diet and person is as yet not a paramount social objective. The component parts of genius itself have been analyzed and declared to be nine-tenths perspiration and one-tenth inspiration.

"But for the plowshare and the harrow where should we be? Every building, every business, every culture, and prosperity in this city, state, and nation, relies basically on the success attending the use of those implements."

"The almond tree, first blossom tree of spring, blooms for the birthday of the man who split rails and lay at eventide beside his fire reading his bible."

"Let us think straight about the subject of work. If our fountain springs of thought break not true, how will our rivers run?"

THE INDUSTRIAL ARTS ROUND TABLE OF CHICAGO

Under the leadership of Mr. L. W. Wahlstrom, the Faculty of the Francis Parker School, Chicago, presented a program on "Aids to Effective Shop Teaching". There were exhibits of books, moving picture and projection machines, slides, pictures, drawings, charts, models and manuals on how to make excursions of value in the school life of the pupils.

Mr. Wahlstrom pointed out his "library of three" books which were in existence in the early days of his teaching experience and then pointed with pride to the industrial arts section of the school library. There was a wealth of material on view and much more filed and indexed so that it is readily available for the boys and girls who take shop work.

Dr. H. T. Lukens had several models illustrating industrial processes such as the cotton gin, the flour mill, the grain elevator, and for the less serious minded, some models showing the changes in transportation in the United States. A "Mayflower" and a square rigger attracted our attention especially. Dr. Lukens is a liberal education in himself and made the point that models produce a permanent and clear sense impression.

Mr. W. W. Worthley demonstrated several projectors for assembly and classroom purposes. Then he read a list of source materials and quoted from the "Educational Screen", March number, to sum up the variety of material available for the class or shop teacher and where these materials may be obtained. Later in the evening we had the moving picture of Mr. Thos. A. Edison and the development of the electric lamp from its invention to the present day.

Mr. R. W. Osborn, assistant principal of the school and head of the science department, described methods of preparing for, conducting and the follow-up of industrial excursions. The texts and much of the library material used in schools are from 5 to 10 years behind the times and excursions are necessary to make real to

the pupils, the principles demonstrated in modern science classes and laboratories. The excursion is extension work and should be just as thoroughly planned for as the daily lessons. A study of what the boys are to see may frequently be made through pamphlets which many large plants publish. And after excursions there is a changed attitude toward the work of the school because of the contacts which the excursion made possible. The test tube means something after wholesale production is seen. So if boys are told that what they see must be accurately reported, they will look for the significant things—which makes order much easier to maintain. Mr. Osborn read from several papers reporting visits to the Corn Products and the By-Products Coke plants. These papers are passed on to the English Department and they say that these reports are frequently the best papers the boys write. One of the important things to make sure of is that all pupils hear what the guide is saying and a megaphone has been found to be a valuable aid to hearing in noisy places. This enables a boy to realize what is going on and questions can be answered at the time. In no other way can boys get accurate ideas as to such things as automatic machinery, the number of products which comes from corn and how the modern factory worker is protected from bad odors and dirt, etc.

The discussion after the talks brought out further interesting points—one school man who did not wish to be quoted by name said that his boys had taken twenty excursions last year on school time and that he thought it was worthwhile if followed up by well written and accurate reports.

The Round Table will hold its last meeting of the year at the University of Chicago on May 7th. We regret that we did not get to see the operation and machine operator's school of the Illinois Bell Telephone Company, but Mr. F. S. Hurd kindly extended the invitation to next year. The attendance at the Round Table has been a matter of comment every time for the members have increased and the distance traveled by members reminds one of convention time. Waukegan, Elgin, Aurora, Joliet, South Bend, Mishawaka, and Purdue were represented at the March meeting and as there is room for more the secretary will gladly mail the detailed announcement to anyone interested in the practical arts.

Robert B. Bagby.

NEW JERSEY VOCATIONAL AND ARTS ASSOCIATION

The tenth annual convention of the New Jersey Vocational and Arts Association met on March 19 and 20, in Paterson, with headquarters at the Alexander Hamilton Hotel. The local chairman, Mr. Leonard Stolk, arranged a fine program for the meetings. The local Chamber of Commerce, and the city and school officials cooperated to make the convention a success. President Philip M. Wagner of Newark, officiated.

On Friday visits were paid to industries and schools in Paterson, followed by a meeting at four o'clock. After the banquet, Mrs. Lucinda Prince of Boston, spoke on the subject "Selling Your Job." Later followed an enjoyable entertainment. Sectional meetings were held on Saturday morning at the east side high school for teachers of art, continuation schools, household arts, manual training, printing, sub-normals, supervisors, vocational boys, and vocational girls. At a luncheon Saturday noon Rev. E. E. Weirs, of Montclair, spoke on the Youth of Today.

The officers elected for the ensuing year were:

Miss Clara H. Krauter, president, Girls' Vocational School, Atlantic City, N. J.

Mr. J. H. Constantine, vice-president, Director of Industrial Education, Passaic, N. J.

Miss Ruth Cully, secretary, Continuation School, Plainfield, N. J.

Mr. Arthur Perry, treasurer, Supervisor of Industrial Arts, Rahway, N. J.

Manual Training Section

Mr. Arthur L. Perry, Rahway, presided over the manual training section.

Teachers of industrial subjects are awakening to the value of pictures in teaching. Mr. George F. Bowne, Barringer High School, Newark, in speaking on "Visual Aids" was enthusiastic upon their possibilities. There is an old Chinese saying that "a picture is better than ten thousand words." Mr. Bowne would double the quantity and make it twenty thousand words. There are many ways to use pictures as teaching material. Years ago the picture postcard reflector seemed quite a possibility, and then the stereopticon came into shop use. With the latter much may be accomplished although the field is limited. The strip film machines are better than slide machines for shop use. It is possible to obtain for about three dollars each lecture sets of forty to fifty industrial subjects.

Mr. Bowne has made use of a picture bulletin board. Many subjects may be handled such as: Tool classifications, radio evolution; industrial pictures of interest; sources of materials, and preparation of materials. Picture charts are also useful in shop talks and demonstrations. Manual training teachers may obtain material for charts of this kind from trade and industrial art magazines and charts prepared by manufacturing firms.

At the Lafayette St. School in Newark Mr. Bowne formerly used a moving picture machine to give boys an insight into things which are hard to describe in words. Mr. Bowne exhibited "Lumbering in the North Woods" from the Ford films and "Foresting the Sand Hills" from the United States Department of Agriculture, to illustrate how he employs such films in his classes. "If you want to vitalize your work," said Mr. Bowne, "visualize it."

Mr. Fred P. Reagle, director of industrial and fine arts at Montclair, outlined "tendencies in industrial arts." He feels that Dr. Bonser's plan of industrial arts for the first six grades is proving very sound. In that plan the grade teacher's job includes the teaching of music, art and handwork.

Mr. Reagle believes that in the junior high school teachers should concentrate on one main objective for industrial arts and subordinate other aims to it. The main objective will vary in different localities. For some localities the idea set forth by Dr. Bobbitt is valuable. He suggests training for unspecialized vocational activities, as an objective (such as, repairing electric appliances and household mechanics), and giving an insight of an informational nature into industry. There is a tendency to have the industrial work in the senior high school of a vocational nature.

Mr. Edmund J. M. Herd, director of industrial arts at New Brunswick, spoke on "The Value of a Teacher Rating Scheme to the Teacher and Supervisor." When a supervisor makes a report to the superintendent on a teacher's work he should base it upon more than snap judgment. There should be an accumulative record of a teacher's progress. Seventy-five per cent of the larger cities have some kind of a teacher rating scale. Rating schemes must be revised many times. It took ten years for a satisfactory scheme to be worked out in New York City. So far the methods of rating are subjective, with a hunt going on for an objective method. There is quite a general agreement upon these items: (1) Two or more persons are to do the rating; (2) new teachers must be advised as to the rating scale; (3) constructive help must be given before rating, and (4) teachers are to receive a copy of final rating.

The Art Section

In the art section conference, the leading speaker was Mr. Forest Grant, director of art in New York City, who spoke of the changing ideals of modern art education. In former years, the aim of art training was to develop the ability to draw. A few talented students recieved most attention while the others struggled along as best they might.

In contrast to this the schools of today are, and should be, aiming to use art instruction not for mere technical excellence, but for the development of creative imagination, the joy of self-expression, and the ability to appreciate all forms of beauty. This faculty of appreciation should be encouraged and strengthened in many ways, until all children come to see the practical value and application of art principles to their own lives and surroundings. Art should function for the masses, not for the selected few.

Several times, Mr. Grant said, he had invited a well-to-do business man of his acquaintance to visit the Metropolitan Museum with him, but his friend always refused, saying he knew nothing whatever about art. One day Mr. Grant asked him why he had bought the particular make of new car that he was driving. The man launched out into a detailed description of the superiority of that car over all others in the matter of line, proportion and color. At the end of fifteen minutes, Mr. Grant said, "You may not know it, but you have just given me a fine discussion of art as applied to automobiles. Other people study art in relation to furniture, textiles, or clothing. Now come to the museum with me." The man did so, and discovered that art is a real, a vitalizing influence in his life, which he has been using, unconsciously.

Many people think that art is a mystery, not easily comprehended. Grade teachers often say, "I can't teach art. Why, I can't draw a straight line." What has that to do with it? Boards of education do not consider that only scientists can teach science, or that expert accountants are necessary to teach arithmetic. The average teacher who teaches the regular subjects, can teach art as well.

Mr. Grant's talk was a splendid introduction to the problems discussed by Miss Henderson, director of art in Paterson. She showed projects worked out by grade teachers under her supervision, all of which were of a high order of merit. She told of the new spirit of cooperation between the manufacturers who operate the big silk mills of Paterson, and the schools. The latter are trying to give the children taste and judgment in recognizing and selecting fabrics and articles of fine design and color, and experience in developing designs suitable for the decoration of materials. This training, it is hoped, will make them more intelligent consumers, and serve as a foundation for whatever occupation they may follow. The manufacturers have expressed a willingness to assist in whatever way they can, by establishing scholarships for talented children, or by making collections of beautiful examples of design which may serve to stimulate and inspire students. The outlook for the future development of art in Paterson is exceptionally bright.

Miss Marguerite Marquart, of Newark, brought work from the Fawcett School of Design, illustrating the difference between the objectives of the art school and the high school. In an art school, technique is insisted upon. Creative imagination is not neglected, but the final result must be as nearly perfect as it can be made.

In the high school this "finish" is not possible nor desirable, for only a few can attain such a standard.

The exhibition of work from the Paterson schools was excellent and much enjoyed.

Boys' Vocational Section

Mr. J. Mason, director of the Paterson Vocational School, emphasized the need of having in the vocational school curriculum only those subjects which boys actually need on the job. "How much money or time would you spend to have your child learn to speak Esquimo, or Greek, or Latin? If you would not spend your own money for these and other subjects, why spend public money to do it? The Paterson vocational school keeps in close touch with industry through a board of trustees and an advisory committee. The advisory committee consists of two employers and two employees for each trade for which instruction is given. These men make suggestions as to the equipment required and also as to the curriculum.

Mr. Martin J. Corcoran, director of the Elizabeth Boys' Vocational School spoke on the "Advantages of Production in the Shop" and emphasized the fact that the product of the vocational school first of all is boys. The by-product is commercial articles.

It should be remembered that the schools are not endeavoring to turn out finished mechanics. So the by-product should not be beyond the ability of the average boy. It should not require too long a time to complete the by-product. There should be enough repetition to give the drill required to fix certain facts in the student's mind. A higher degree of accuracy is required in commercial work than on the exercise basis.

In trades where it is not so easy to give instruction on actual jobs, as, for example, carpentry, plumbing, and electricity, the cooperative schools seem to be the logical solution.

Mr. Harry Severn, instructor in the Irvington Vocational School, spoke on the "coordination of related subjects to production."

The school shop trains the boy to gain skill; the related work trains in the "how and why." The old apprenticeship system trained in the doing only. The apprentice had to obtain the "how and why" by whatever way he could. The vocational school is emphasizing the development of operative skill plus the technical side. Success in dealing with boys is possible by getting them interested in the work. This is particularly true in related subjects. Geometry and algebra are uninteresting in themselves, but when applied to jobs in the shop, and done as the mechanic would do them, they take on new life.

Household Arts Section

Supt. John Wilson, of Paterson, addressed the members of the household arts group, explaining the purpose of home economics in the curriculum.

The principal speaker of the meeting was Miss Wilhelmina Spohr, assistant in household arts education, Teachers College. Her topic, "Trends in Household Arts," was very interesting and informative.

THE EASTERN ARTS PROGRAM

The Eastern Arts Association will hold its seventeenth annual convention April 21st to 24th, at Syracuse, N. Y.

The Trunk Line Passenger Association, the New England Passenger Association, and the Central Passenger Association have granted reduced return railroad fares to members of the Association who obtain certificates at the time of purchasing their tickets.

The registration headquarters will be located on the tenth floor of the Hotel Syracuse, while the general meetings and sectional conferences will be held in the parlors and the ballroom of the same hotel.

At the opening session on Wednesday, Mr. Henry Turner Bailey will talk on "The Magic Realm of Art," and Mr. Lewis A. Wilson of Albany, N. Y., will discuss "Modern Educational Tendencies."

At the Thursday morning session, Miss May Robinson of Washington, Ind., will talk on "Art in the Community," and Dr. David Snedden of Columbia University, will discuss "Criteria of Values for Junior High School Industrial Arts." In the afternoon. Mr. F. J. Trinder of Hartford, Conn., will talk on "Opportunities for Industrial and Technical Training in Day Schools;" Mr. N. F. Hubbell of State College, Pa., will discuss "Cooperative Part-time Industrial Courses;" and Mr. A. B. Anderson will take for his subject, "The Need of Evening Extension Courses for Industrial Workers." At the special art section, Miss Cynthia Joyce, Buffalo, N. Y., will demonstrate applied design, Miss Dorothy Houghton of Buffalo, N. Y., a course in high school design, Miss Margaret Giesecke, Buffalo, a course in advertising design, and Mr. Ernest Watson, Brooklyn, N. Y., appreciation and creation in art classes.

At the Thursday evening session, Dr. F. G. Bonser of Columbia University, will talk on "The Arts as Opportunities for Creative Adventure."

At the Friday morning session, Mr. Wesley O'Leary of Trenton, N. J., will give a talk and Miss Leila Mechlin will speak on the subject, "Eternal Propaganda of Beauty by the American Federation of Arts."

On Friday afternoon, there will be a number of conferences on manual arts, home economics, and part-time education. At the manual arts section, Mr. G. E. Hutcherson of Albany, N. Y., will talk on "Vocational Guidance Through Industrial Arts Courses;" Mr. H. W. Hepner of Syracuse, N. Y., will discuss "Psychological Aspects of Vocational Guidance;" Mr. James F. Barker of Rochester, N. Y., will talk on "Art in the Junior High School," and Mr. J. H. Constantine of Passaic, N. J., will give an address on "Present Day Tendencies in Manual Arts."

At the home economics section, Miss Martha Van Rensalaer of Cornell University, Ithaca, N. Y., will talk on "Reconciling the Income and Household Art," and Miss Anna M. Cooley of Columbia University, will discuss "Opportunities for Service Through Home Economics."

At the part-time section, Mr. Paul Cressman of Harrisburg, Pa., will talk on "Up-Grading Continuation School," Dr. Franklin J. Keller of New York City, will discuss "Art, Brawn, and Culture," Miss Mary Jones of Newark, N. J., will give a talk on "The Continuation School Curriculum and Methods of Teaching," and Mr. Wm. R. Ward of Trenton, will discuss "The Continuation School and Its Relation to Industry."

On Friday evening there will be an association dinner, with Pres. George F. Hatch presiding, and Mr. Henry H. Denham as toastmaster.

Saturday morning will be given over to the president's annual address and to other addresses. Mr. James C. Bourdeau of Pittsburgh, Pa., will talk on "The New Tradition in Prints," and Mrs. Edith J. R. Isaacs of New York City, will give an address on "The Theater Among the Arts."

On Saturday afternoon there will be a special meeting of the teachers of printing, in charge of Mr. S. G. Gosnell of Syracuse, N. Y. The speakers at this meeting will be Mr. Henry H. Denham of the Blodgett Vocational high school, Mr. F. A. Coates of Massachusetts, and Mr. H. E. Milliken, of the Boys' Trade School, Worcester, Mass.

There will be a complete commercial exhibit of various reliable educational firms on the tenth floor of the hotel.

NEW BOOKS

Furniture Projects

By Frederick J. Bryant. Paper, 47 pages. Price, $0.56. Manual Arts Press, Peoria, Ill.

The book presents a collection of drawings for "a comparatively new selection of models" in woodworking for classes in the grades and the first year of high school. No attempt has been made to grade the projects and they are placed before the teachers and students as suggested problems for the individual. The subject matter has been condensed and the references cover the details not treated in the text. The projects include such pieces as tables, piano benches, bookcases, phonographs, sewing cabinets and screens, desks, clocks, mirrors, lamps and tea wagons.

Measured Drawings of Early American Furniture

By Burl N. Osburn and Bernice B. Osburn. Cloth, 82 pages. Price, $1.80. Bruce, Milwaukee.

Collections in furniture-making, as in other lines, are justified because no designer is able to create or to plan an entirely new article but must depend largely upon collecting and rearranging elements from old material. The permanent value of a reproduction depends on the degree of good judgment and taste which are used in such selection and variation.

In furniture-making it is possibly true that no one piece will combine within itself the ultimate end of its requirements, yet it is possible to find those that are unquestionably superior in one or more, and satisfactory in the others, or at least capable of modification.

The present book has been prepared with this end in view, keeping entirely to the products of our own early American designers and cabinet-makers. Each piece has been chosen for its artistic value and as a real American product, which deserves the interest and study of American designers. In studying these examples of furniture-making one is able to understand just a little better the aims and ideals of the men who created them and to develop an appreciation of the customs and lives of the people who used them.

The book opens with a study of American furniture and its makers, including such designers as Phyfe, Savery, and Pendleton, together with examples of some of the best early designs in Colonial history. It offers then detailed drawings and photographs of fine pieces of furniture such as a Pendleton sideboard, gate-leg tables, chests, sewing tables, mirrors, butterfly tables, a four-poster bed, a tall clock, a high-boy, tilt-top tables, etc.

The book offers a choice collection of pieces not too elaborate and not overdone. The material chosen is tasteful in design, strong in workmanship, and excellent in the details.

Teachers in advanced classes will find the book useful for reference and as an aid in finding good period problems.

National Apprenticeship Training Plan for the Sheet Metal Industry. Presented by the Vocational Education Committee of the National Association of Sheet Metal Contractors in June, 1925, and issued by the National Association of Sheet Metal Contractors, at Philadelphia, Pa. The present plan was evolved as a result of the shortage of sheet metal mechanics and the inadequacy of the existing apprentice training methods in coping with the task of producing trained workmen for the industry. The plan is capable of adjustment to any section of the country through minor changes suited to the individual needs of the locality. It presents the qualifications of an apprentice, offers rules governing the apprentice, the duties of the apprenticeship committee and the employers, and offers suggestions for equipment, school program and course of study. There is an outline of an eight-unit course in sheet metal, together with a list of related subjects. The plan is considered the most complete which has been offered the sheet metal industry in that it offers a most complete and practical apprenticeship training plan.

NOW, ARE THERE ANY QUESTIONS?

Tests for Determining Fitness in Vocations

Q. We are wondering if the Question and Answer Department of the Magazine can give information on standard tests for high-school manual training students? What sets do you recommend as aids in determining students' choice and fitness for vocational work.—E. F. F.

A. Stenquist's Mechanical Aptitude Tests, by J. L. Stenquist, price $1.50 per set, Teachers College, Columbia University, New York; MacQuarrie Test for Mechanical Ability, price $1.50 per set, issued by T. W. MacQuarrie, University of Southern California, Los Angeles; Hunter's Tests for Woodwork, Radio, and Machine Shop New York City; Thurstone's Vocational Guidance Tests, by L. L. Thurstone, issued by the World Book Co., Yonkers, N. Y.; Wardner's Test for Knowledge of Tools, issued by C. A. Wardner, Jackson, Mich.

Canteens for Boy Scouts

Q. Can I use black iron in place of bright metal in making canteens for boy scouts?

A. No. It would not be feasible to use black iron, because it would be almost impossible to solder black iron, and the metal would rust quickly and would not be sanitary.

The best way to make canteens in the school shop is to buy two tin pie plates and seam them together. After this, cut a hole in the edge and insert a spout which can be bought in any store handling sheets.—C. L. Bailey.

A Glue Problem

Q. 597. I would like to know how to glue rosewood to rosewood so that it will hold. I have tried cold "Le Page's" glue, hot "Sure-Grip," and Casein cold water powdered glue, but without success.

Is there a glue that will hold or must the wood be treated and remove the high oil content first?—J. H. B.

A. In looking over my files, and talking with veneer men of my acquaintance, I find that the joining of rosewood to rosewood is very rare since the work is generally handled as a veneer on a pine core. The only practical suggestion which I have to offer is that the joint be sized with orange shellac made from stock reduced with three volumes of denatured alcohol. A grade of satisfactory cabinet glue, to be used hot, can be purchased. Ralph G. Waring.

A Finish Room Layout

Q. 585. We are seeking information about how we should ventilate our finish room. With the two possible ways to heat this room, how should we ventilate? Wouldn't the heat from a large furnace be dusty? Or, could a series of oiled cloths be hung at the mouth of the shaft? We wish to make these changes at a small cost if possible.—M. H. F.

A.: The accompanying sketch illustrates the layout of the questioner's room. With the traffic from the shop to the office, with gas and dust from the stove, it is out of the question to do respectable finishing in the original layout. It is suggested, therefore, that a cast iron hot water furnace unit, such as that made by the American Radiator Company, be installed about twelve inches above the level of the burning coal and connected with a run of 4¼" pipe coils along two sides of the room as indicated. The local steam fitter and plumber should be able to do this correctly, care being taken to provide an expansion tank and to have the whole system filled with rain water in order that no scaling may take place in the furnace heating unit. Owing to the freedom from dust, steadiness of heat and other advantages, this is the best recommendation.

If the furnace is used with one or two registers, it will be necessary to make a 26 galvanized iron pan about two inches deep and four inches wide as per sketch. Three-eighths inch iron rod can then be bent to form a pyramidial cone about four feet high, to be covered with pearl or opal screen wire, fly screen type. This should be shoved over the register and to catch the dust should be brushed with cylinder oil about twice a week and occasionally should be given a thorough scrubbing inside and out with gasoline and a brush to remove accumulated dust. By no means use oiled cloths hung across the register because of the extreme danger of combustion.

OFFICE
HEADER. USE BLEEDER IF NECESSARY
IF FURNACE PIPE IS USED LOCATE REGISTER HERE BECAUSE OF FLOOR DRAFTS FROM WINDOWS
FINISHING ROOM
22'X 32'
4 COIL RUN OF 1¼" BLACK IRON PIPE PAINT CREAM OR IVORY FOR MAXIMUM HEAT REFLECTION
DO NOT BRONZE
DOORS DO HUNG WITH ASTRAGAL
CAST IRON HOT WATER FURNACE UNIT
PLASTER BOARD PARTITION
CEILING 10' (FINISHED: PLASTER BOARD)

FLOOR PLAN OF A FINISHING ROOM.

The paint shop floor should be given a thorough mopping with Standard Oil Co.'s floor oil twice a month, and the windows should be fastened tight and thoroughly moulded with narrow weather stripping to prevent incoming dust and drafts which would tend to cause uneven drying.

Last of all it is well to provide a ceiling vent connected to a non-rotating but automatic ventilator at least of the 24-inch size.—Ralph G. Waring.

Finishing Cherry

Q. 581. What is the best method in finishing wild cherry in its natural color?—C. G. Q.

A: Cherry varies so in the natural color because of sap streaks and gum pockets that I have always much preferred to finish it the rich shade of typical red brown occurring through years of use.

The wood should be sponged to raise the grain, sanded smooth, and all edges rounded one-sixteenth inch. Apply a diluted coat of brown mahogany water stain, after having tested the color on a sample piece of stock. Let dry over night and, without sanding, apply a sizing coat of orange shellac, diluted with three volumes of alcohol and tinted slightly red with alcohol soluble Bismarck brown. Dry until hard, and sand smooth with a split 6-0 garnet paper, dust off and varnish with a well brushed out coat of high grade floor varnish. Dry three to five days, moss off with No. 0 steel wool, clean and revarnish. Repeat for three or four coats as desired, rubbing the third and fourth coats to a perfect surface with FF pumice stone, felt pad and water. Clean up with a good polish.—Ralph G. Waring.

PUBLICATIONS RECEIVED

Industrial Arts Education in Grades Seven, Eight and Nine. Bulletin No. 4, 1925, issued by the State Department of Public Instruction, Harrisburg, Pa. This bulletin places emphasis on the general shop in small school systems where industrial arts instruction of the type contemplated may be given. In larger districts where separate shops for the several forms of manual arts work are attempted, it is held that the general shop is not considered the best plan. The pamphlet aims to offer suggestions for work adapted to pupils of the seventh, eighth and ninth years where the pupils are seeking to know the kind of a life career they should enter. The bulletin covers such points as the terminology of industrial arts and vocational education, the aims of industrial arts instruction, means and methods of presenting the instruction, vocational guidance, and scope of problems.

My Life Work. The Printing Trade Series—The Composing Room. Milwaukee Vocational School, Milwaukee, Wis.

This is the latest addition to the series of informational booklets describing the several occupations available for boys in the city of Milwaukee. It takes up the work of the composing room and analyzes the history and importance of the printing trades, the character of the work carried on in the composing room, the qualifications necessary for success, and the education and training which the printers must have. Details of working conditions, promotional possibilities, wages, etc., are presented so that the boy who intends to go into the trade will have an ample understanding of what lies before him.

STANLEY

Steel Planes reduce breakage

Don't overlook this important feature when buying planes.

You cannot avoid a certain amount of rough handling in a school shop. For this reason you will be interested in the new Stanley Steel Planes.

The bottoms are of pressed steel instead of the usual cast iron. The lever caps and frogs are of malleable iron castings.

These planes are of the same type and quality as the famous Stanley "Bailey" Planes that have been the favorites of the carpenter for many years.

The Stanley Catalogue No. 34 should be in the hands of every manual arts superintendent and instructor. It lists and shows pictures of over 1,500 items, as well as detailed drawings, of their construction. In addition, the appendix gives a number of tables covering subjects pertinent to woodworking. You should have a copy of Catalogue No. 34, by all means.

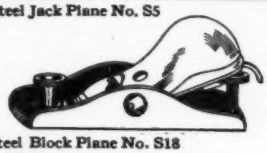
Send for it today

THE STANLEY RULE AND LEVEL PLANT

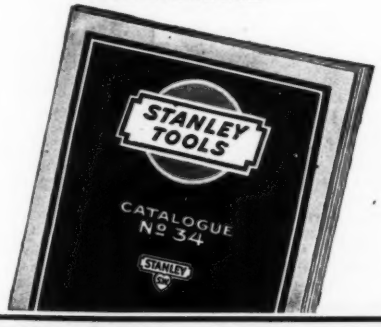
Educational Department, New Britain, Conn.

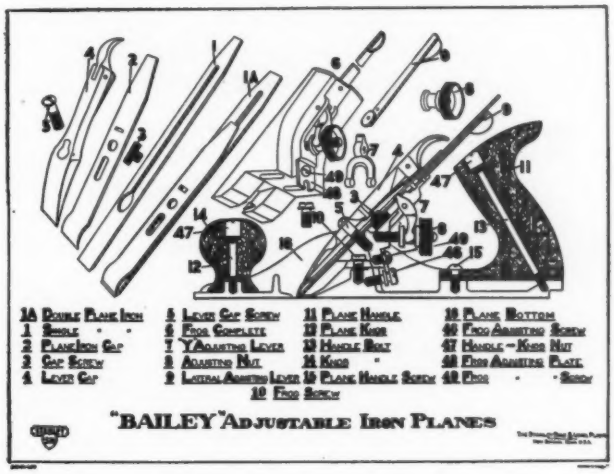
Steel Smooth Plane No. S4

Steel Jack Plane No. S5



Steel Block Plane No. S18





These Charts were made to help the busy Instructor

The use of the above chart will save considerable time and aid materially in instructing the pupil in the construction, nomenclature, and adjustment of woodworking tools. Each chart covers one tool. Separate charts are prepared for planes, squares, chisels, bit braces, combination planes, dowling jigs, rules and dowel turning machines. Also charts showing common joints and the several cuts that can be made with Stanley combination planes.

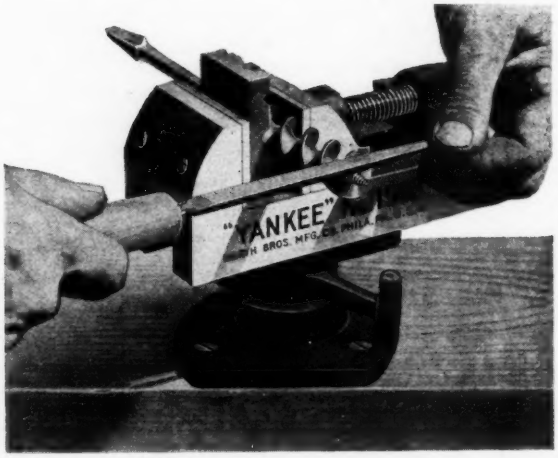
Sent free.

STANLEY TOOLS

STANLEY

STANLEY EQUIPMENT S.W. IS STANDARD EQUIPMENT

Good Schools Deserve "Yankee" Tools



The Handiest Vise in the World

You can do work with this "Yankee" Vise that is impossible with any other—and do it with speed, accuracy and ease.

Not only has a swivel base so you can turn it around in any position, but detaches from its base.

You don't have to remove work from vise until entire job is completed—simply lift vise, work and all, off base, and carry to drill press, milling machine, etc.

Sides, ends, bottom and top are machined true.

Hardened steel block with V-shaped grooves of various sizes holds round or irregular work.

You can get the size most convenient for your work.

No. 1991—Jaws open 1½"
No. 1992—Jaws open 2"
No. 1993—Jaws open 2¾"
No. 1994—Jaws open 4"

Some other "Yankee" Tools

Ratchet Hand Drills	Ratchet Screw Drivers
Ratchet Breast Drills	Ratchet Tap Wrenches
Ratchet Bit Braces	Automatic Push Drills

Dealers Everywhere Sell "Yankee" Tools

"Yankee" on the tool you buy means the utmost in quality, efficiency and durability

Write for FREE "Yankee" Tool Book

NORTH BROS. MFG. CO., Philadelphia, U. S. A.

"YANKEE" TOOLS
Make Better Mechanics

NEWS AND NOTES

Alabama Society Meets. The Alabama Society for Vocational Education held its annual meeting on March 26th, at Birmingham. The program was divided into departmental groups, for the discussion of problems relating to agriculture, home economics and industrial work. Mr. Terry C. Foster, Montgomery, talked on "Phases of Civilian Rehabilitation;" Dr. C. B. Glenn, Birmingham, discussed "The Development of Character Through Work," and Mr. R. L. Cooley, Milwaukee, Wis., gave a talk on the subject, "Where Does Business Come From?"

Scholarships for Vocational Students. The President of the Union Pacific Railroad has announced an extension of the scope of its agricultural scholarship competition, heretofore open only to members of the state university extension service in the states of Oregon, Washington, Nebraska, Kansas, Colorado, Wyoming, Utah, and Idaho, to students of vocational agriculture in Smith-Hughes high schools in counties served by the Union Pacific Lines. The system contemplates two awards, one of $100 for full course in the state university school of agriculture, the other an award of $50 for a winter short course.

The competition is open to boys and girls between 14 and 21 years of age, who are students regularly enrolled in high school vocational courses, and the scholarships will be awarded by committees in each of the counties. The offer of the president affects those counties in Oregon traversed by the lines of the Union Pacific Railroad and the offer has been received with enthusiasm by boys in the field.

A Machine Shop Course. A new departure in trade and industrial education has been made at The Dalles, in Polk County, Ore., with the establishment of a machine shop course.

Gustafson to Make Survey. Mr. Lewis Gustafson, of the Ranken School of Mechanical Trades, St. Louis, Mo., has been engaged to make a survey of the reformatories of Missouri in order that vocational training may be introduced. The purpose of the survey is to determine what may be done toward improving the conditions in the schools, and it is Mr. Gustafson's work to make recommendations for the establishment of vocational training. He will also recommend a supervisor to be employed by the Penal Board for the establishment and conduct of vocational training at Boonville.

Issue Card List of Motion Pictures. The Bureau of Mines of the U. S. Department of Commerce, has issued a list of its motion pictures and the plan of distribution for the same. The films are produced under the direction of the Bureau of Mines, of the Department of Commerce, and are distributed by R. A. Wood, of the Bureau of Mines, Pittsburgh, Pa. The Bureau offers to send a descriptive list of films showing the contents of each reel upon request.

Industrial Arts in Baltimore Junior High Schools. The industrial arts courses in the Baltimore junior high schools occupy an important place in the junior high school curriculum. Of the three courses—academic, commercial and industrial—the latter is equally as attractive as the other two, and the enrollment is about one-third of the total. Every boy is required to take from two to four periods of shop work and four periods in mechanical drawing. During the three years in the junior high school the students will receive a different kind of shop work each semester. The shop work at present includes wood-working, sheet metal, electricity, machine-shop practice and auto-mechanics.

Among the aims of the industrial arts work are the following: To provide exploratory, finding, or try-out courses in several industrial or trade activities; to develop an understanding and appreciation of industrial and trade occupations; to offer practical types of training designed to meet and adjust the individual differences in pupils, and to lay a true and solid foundation for the vocational training to follow.

Pennsylvania Society Holds Meeting. The Pennsylvania Society for Vocational Education held its annual luncheon at the Hotel Casey, Scranton, with an attendance of 220 persons. President Killius presided. Dr. F. B. Haas gave an interesting address; Dr. C. A. Prosser of Minneapolis, discussed "Part Time Education in Theory and Practice," and Mr. L. H. Dennis gave a report concerning the American Vocational Association.

At the business meeting following the luncheon, the Society elected the following officers: President, Mr. C. F. Bauder, Philadelphia; secretary-treasurer, C. E. Hedden, Harrisburg; assistant secretary-treasurer, V. A. Martin, Harrisburg.

General Shops Installed. Well equipped general shops have been installed in the new junior high schools at Uniontown, Pa., with accommodations for from eighteen to twenty boys in a section. Mr. Harry Woods and Mr. J. O. Judge teach in these shops.

Cooperative Vocational Course. A well-rounded course of cooperative vocational education is being offered at Lock Haven, Pa. Emphasis is laid on the selection of trades by the boys and to tryouts in these trades. Twenty-four employers are cooperating and fifty boys have been placed. Among the activities used for training purposes are automobile mechanics, electrical construction, house wiring, carpentry, painting and paper hanging, plumbing, printing, furniture repair, baking and butchering. Mr. F. S. Fletcher is director of this work.

Evening Industrial Classes. Evening classes in cabinetmaking, metallurgy, and industrial chemistry were undertaken this year at New Kensington, Pa. Plans have been made for the addition of new courses in foremanship training, modern industry, and salesmanship.

(Continued on Page 28a)

KESTER Self-Fluxing SOLDER

Makes Soldering Easy, Clean and Certain

"Requires Only Heat"

KESTER *Acid Core* **SOLDER**

KESTER ACID CORE WIRE SOLDER

For general Soldering on new and old work.

It contains a scientifically prepared acid flux which cuts down to the metal, chemically cleaning the parts and permits the solder to take firm hold. Standard size No. 3 about one-eighth inch in diameter, runs about 30 feet per pound, packed in one pound cartons, one, five and ten pound spools.

For general soldering on new or old work in the general shop, sheet metal shop, home mechanics shop, specify Kester Acid Core Wire Solder.

THE MODERN WAY

Kester Self-Fluxing Wire Solder is of high quality and combined with it is a scientifically prepared flux. The flux is held in tiny pockets inside the hollow wire form of virgin tin and lead. It flows on the job just before the solder melts, insuring proper fluxing and well soldered joints.

Kester "requires only heat," eliminating the acid pot and saving time, labor and material.

Kester is easy to use and enables a novice to do clean, substantial work and the mechanic to double his output.

Kester is especially suited for use in school shops. It is easy to use, convenient to handle and insures better soldering results.

Use Kester Solder on Your Soldering Projects

The practical way of determining the merits of Kester Solder is to let your boys use it on their soldering project. Read the following letter from a supervisor of Industrial Arts:

> *"Kester Self-Fluxing Solder is the best solder I have used for classroom work. The pupils can do creditable work the first time they use it. All are surprised at the results, and their ability. Kester Solder will be in demand wherever any of my pupils have occasion to do soldering. "We are very grateful to you for your courtesy and aid in this matter. You can rest assured that you have made many new acquaintances through the work done in the classes."*

Get a Working Sample for Every Boy in Your School Shop.

So that every boy in your shop can make a practical test by actually using Kester Solder, working samples will be sent without obligation. Simply fill out and mail the coupon.

CHICAGO SOLDER COMPANY

4259 Wrightwood Avenue Chicago, Ill.

KESTER *Rosin Core* **SOLDER**

KESTER ROSIN CORE WIRE SOLDER

The Ideal Solder for Electrical and Radio Work.

Contains a scientifically prepared rosin flux and is the simplest way for experienced or inexperienced persons to make absolutely safe and non-corrosive solder joints. Standard size about three thirty-seconds inch in diameter, runs 50 feet per pound, packed on one, five and ten pound spools and 18 inch sticks in five pound boxes.

For all electrical soldering and radio work specify Kester Rosin-Core Wire Solder.

CHICAGO SOLDER COMPANY,
4259 Wrightwood Ave., Chicago, Ill.

Gentlemen:

Please send the following number of working samples:

.....Kester Acid Core Wire Solder

.....Kester Rosin Core Wire Solder

The number of boys in our shops are:

General Shop.....Electrical.....

Sheet Metal.....Home Mechanics.....

Signed .....

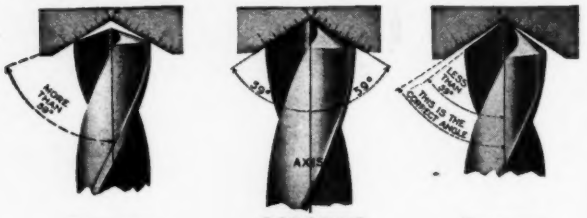
Instructor in.....School.....

City..... State.....

Manufactured by the Originators and World's Largest Makers of Self-Fluxing Solder.

Standard packages sold by leading Jobbers and Dealers in U.S.A. Underwriters' Lab. Inspected.

What is the Correct Angle of Lip Clearance?



Incorrect CORRECT Incorrect

DO YOU, yourself, know the correct angle of lip clearance for a twist drill?

As elementary as it sounds, it is surprising the large number of really experienced men who can be "caught" on this simple question!

If the experienced man frequently doesn't know this vital requirement of a drill point, you will realize how important it is that your students learn it EARLY—and remember it thereafter.

This, and a number of other things about twist drills and drilling practice, will be found in the "Handbook for Drillers", illustrated above, copies of which (in any reasonable quantities) will be cheerfully sent to Vocational Directors and Instructors for the use of their classes.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON

TRADE MARK REG. U S PAT OFF AND FOREIGN COUNTRIES

Manufacturers of Carbon and Cle-Forge High Speed Drills for every purpose; "Mezzo" Super-Carbon Drills; Hand, Jobbers' and Shell Reamers; "Peerless" High Speed Reamers; "Paradox" Adjustable Reamers; "Quick-Set" Reamers "Spirex" Machine Taper Pin Reamers; Chucking Reamers for Turret Lathes; Counterbores; Countersinks; Sockets; End Mills; and the "Exy-Out" Screw Extractor.

(Continued from Page 28a)

Vocational Course in Plumbing. A two-year Smith-Hughes vocational class in plumbing has been conducted this year in the schools of Erie, Pa. J. H. Rainsford is the instructor.

Girls' Trade School Opened. A girls' trade school has been started at the Irwin Ave. School, Pittsburgh, Pa.

New Vocational Department. Director James Killius and Supervisor J. E. Wagner of Johnstown, Pa., are now located in new offices in the senior high school. Practically the entire first floor of the building is arranged for vocational work. Space has been provided for drawing rooms, machine shops, plumbing, electricity, printing, woodworking, carpentry, joinery, pattern-making, and sheet metal shops.

Experiment with Performance Examinations. The shop teachers at Williamsport, Pa., have experimented with performance examinations in shopwork. Under the plan, all boys were examined in the shop, and grades were based on the actual work done. The examinations took the form of a rating scale, and each student was rated on the following points: Accuracy, time required, care of tools, shop etiquette, false moves, attitude, safety precautions, care of machine, and conservation of materials.

During the first semester of this term measures were taken to counteract first-year dropouts. Last year the dropouts reached the proportion of twenty per cent. It was noted that the dropouts were generally those who had failed in two or more subjects. A grading scale was prepared, based on accepted grade curves. The scale which was arranged to compare with regular academic grades, was very successful, the dropouts for the semester being only two per cent, as compared with twenty per cent for last year.

Industrial Arts Courses. Industrial arts courses are being introduced in the Ashbourne grammar school of the Cheltenham Township (Pa.) school district. Shop facilities for general shop activities in woodwork, metal, electricity, printing, cement, and concrete work have been provided. A separate room has been set apart for mechanical drawing classes.

Apprentice Training in York, Pa. A total of 55 firms are employing apprentices in cooperation with the industrial department of the high school at York, Pa. The cooperative program for apprentices is operated on the alternative two-week plan and a report is rendered by the boy upon his return to school. The report shows the money earned, the hours worked, the operations performed, and includes a letter to the head of the department.

Machine Shop Course. A machine shop course with equipment has been installed in the industrial department at Butler, Pa. General shop courses with multiple activities in cabinet-making, patternmaking, woodturning, mill machinery, cement construction, foundry work, practical and mechanical drawing are offered.

Better Printing Contest. A printing contest was held in the school shops of Pennsylvania during March for the purpose of increasing interest in printing instruction, promoting comparative examination of prevailing practice in typography and design, and emphasizing the importance of the project as a teaching expedient.

Blue Print Reading. A blue print reading class was conducted at Wichita, Kansas. Men from the trades studied the plans of buildings either erected or under construction. After a careful study of the plans, the class visited the building site and checked over the job according to the plans. The arrangement increased the interest of the class, besides giving them a chance for additional checking of plans.

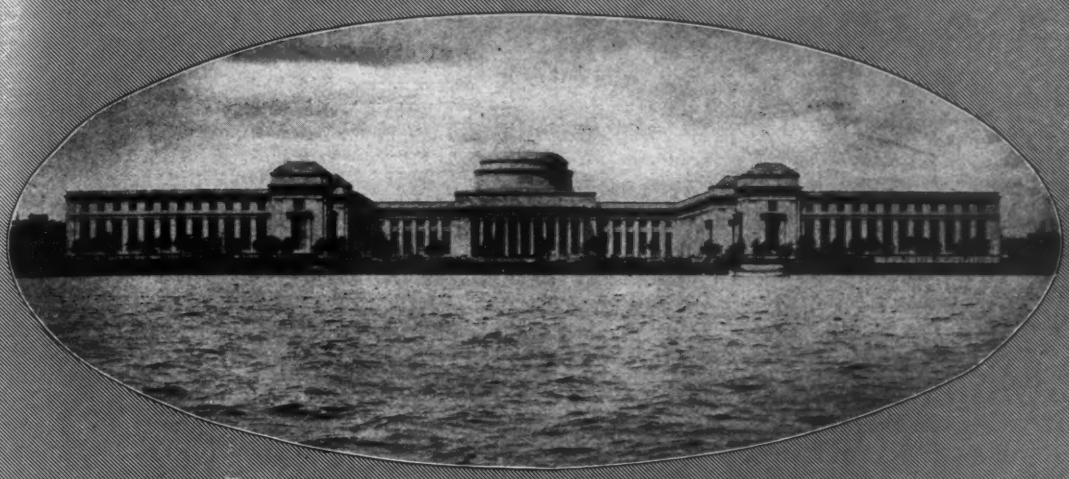
Sheet Metal Drafting. A class in sheet metal drafting was organized at East Cambridge, Mass., the past winter. The instruction was given two evenings each week. The course was without expense to the students, all drawing material and other expense being borne by the boys' employers, the Peter Gray Company, manufacturers of sheet metal specialties. The class was conducted by Mr. Peter Robertson.

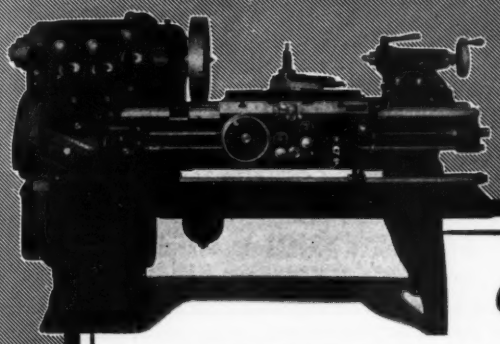
Trade Education in High Schools. Dr. E. T. Franks, of the Federal Board for Vocational Education, speaking recently before the National Council of State Superintendents and Commissioners of Education at Washington, declared the time is not far distant when a high school curriculum will not be complete without some phase of vocational education. He pointed out that vocational education has increased approximately 2,900 per cent since the active inception of the vocational education act eight years ago. At that time the schools were reaching approximately 25,000 students, and now they have a student body of 750,000 studying agriculture, trades and industry, home economics, and commercial education. The need for the work may be realized when it is shown that 92 per cent of those who work in gainful occupations earn their living by working with their hands.

Vocational Counsel Helps Young People. The vocational bureau of St. Louis, Mo., organized last April, is intended to help young people in selecting the work for which they are best fitted. Its work consists of counseling young persons between the ages of 14 and 20 and of recommending those particularly suited to certain positions in the industrial world. While the service is confined largely to public school pupils, it is the purpose of the bureau to serve as many residents between 14 and 20 years as possible. Business men have cooperated with the bureau to a large extent, and it is found that the demand for the services of young persons at present exceeds the supply.

Under-Age Pupils in Continuation School. Nearly 800 New Jersey boys and girls employed in New York City are this year attending continuation school for four hours a week. A tuition fee of $2 a month is charged. The New Jersey law requires

(Continued on Page 33a)





and now —

The Massachusetts Institute of Technology uses The

MONARCH Helical Geared Ball Bearing LATHE

as a part of their Metal Working Equipment.

The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

In choosing the equipment for these students, the directors of the Institute must base their choice upon equipment that will give students the greatest possible amount of experience.

We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

THE MONARCH MACHINE TOOL COMPANY, 464 OAK STREET, SIDNEY, OHIO.

a hard pair to beat

A Starrett Pistol Grip Hacksaw Frame No. 169 — and a Starrett Hacksaw.

Just try that combination *once* and you'll find you have the answer to your hacksaw troubles.

The frame hangs in the hand like a 'gat,' there's plenty of finger room in the handle and the hard rubber grip just fits the hand. Takes any blade from 8 to 12 inches and can be set to cut in any four directions.

If you're looking for a *real* hacksaw frame and some blades that "Cut quicker and last longer," ask your dealer for Starrett Frame No. 169 and some No. 252 or No. 250B Starrett Flexible Hacksaws.

Write us for free copies of The Starrett Hacksaw Book, Starrett Hacksaw Chart and Starrett Catalog No. 23 "CE."

THE L. S. STARRETT CO.

World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes - Standard for Accuracy

ATHOL, MASS.

9062

Use Starrett Hacksaws

WANNER MACHINERY CO.

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14-16 S. Dearborn St.
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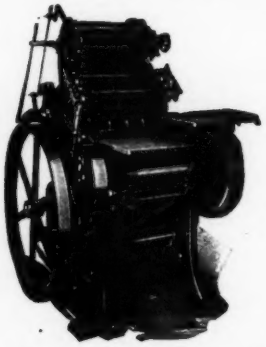


The Chandler and Price Printing Press

Write us for information and estimates about

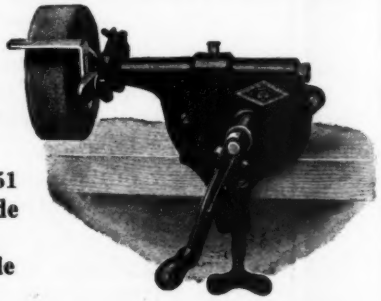
PRINTING MACHINERY, FURNITURE, MATERIALS OR COMPLETE OUTFIT

We sell the best new or inexpensive overhauled machinery, furniture, material and complete outfits.

Ask to have your School or Department added to our mailing list.

Sharpen Edge Tools
on a LUTHER TOOL GRINDER

Ask for catalog and prices.



The No. 51 Best Maide is the Best Made

Manual training instructors, skilled mechanics, carpenters and pattern makers have found that Luther Grinders are the safest and most practical tool grinders made—excellent design and workmanship—a real quality product.

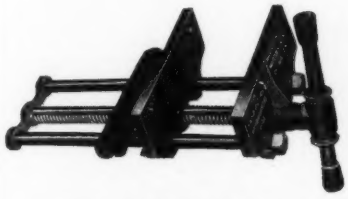
Grinder illustrated is our No. 51 Best Maide, ball bearing, swivel type hand grinder, equipped with combination (medium and fine) grinding wheel, especially adapted for grinding edge tools. No. 51 is equipped with 5x1½x⅞" DIMO GRIT grinding wheel and plain tool rest.

A special chisel and plane bit holding attachment can be furnished — insures uniform, accurate hollow ground bevel always.

LUTHER GRINDER MFG. CO.,
285 SO. WATER STREET,
MILWAUKEE, WISCONSIN.

Morgan Vises for Machine and Wood Shops

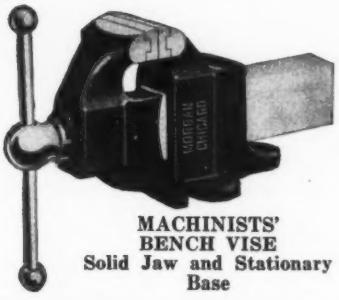
QUICK ACTION WOODWORKER'S VISE
(TOLES PATTERN)



The MORGAN line of Vises for Manual Training Schools is most comprehensive in its scope. A style and size for every department.

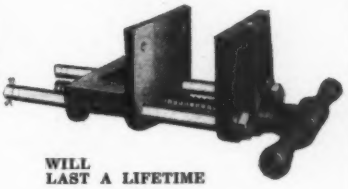
MORGAN VISES GUARANTEED TO GIVE YOU THE SATISFACTION YOU HAVE A RIGHT TO EXPECT.

THE MACHINIST'S VISE SHOWN BELOW ILLUSTRATES OUR No. 40 VISE which is recommended for all Metal working departments.



MACHINISTS' BENCH VISE
Solid Jaw and Stationary Base

SOLID NUT-CONTINUOUS SCREW VISE



WILL LAST A LIFETIME

Our SOLID NUT-CONTINUOUS SCREW VISE (SHOWN ABOVE) has solved the vise problem in hundreds of schools, both in the United States and Canada.

SEND FOR OUR CATALOG No. 26 ILLUSTRATING OUR complete line.

MORGAN VISE COMPANY, Manual Training Department.
558 WASHINGTON BLVD., CHICAGO.

(Continued from Page 30a)

attendance of children until 16 years of age, while the New York law sets the maximum at 17 years. As a result, many employers of New York were giving preference to workers from New Jersey. To prevent discrimination, the New York law will be applied impartially to all under-age workers.

Pupils Construct Tables. The high school manual training department at Ashland, Pa., recently constructed tables for the typewriting classes in the commercial department. The completed tables are perfect in every detail and represent a fine product of the department.

Vocational Classes Started. Evening vocational classes in printing and automobile engineering have been conducted in the high school at Parsons, Kans.

Course for Lithographers. A course for lithographers' apprentices has been opened at the Elm Vocational School, Buffalo, N. Y. The course is the first of its kind to be offered in the city and is the result of a special request of the employers in the lithographic industry.

Course for Machinists. A course in heat treatment of steel has been begun at the Boys' Vocational School, Newark, N. J. The course is intended for machinists, toolmakers, and men in other trades who work with steel. The processes are illustrated by means of motion pictures and lantern slides.

Montverde School Enlarges Scope. The Montverdo School, at Montverde, Fla., a school for manual and mental training, has begun a campaign for $200,000 for enlarging the work of the institution. The school has grown from a single two-room structure to thirteen large buildings, and it has a plant and grounds valued at $500,000.

Class to Build House. The manual training class of the high school at Peru, Ind., will erect a modern residence as a class project. The work will be done under the supervision of the instructor and prominent contractors of the city. At its completion, the house will be sold.

Night Classes Offer Vocational Courses. Vocational subjects are being offered to citizens of Boise, Ida., who desire to fit themselves for trained vocational positions. The work includes courses in automobile mechanics, carpentry, and paperhanging.

Committee Named to Organize Illinois Association. At the closing session of the Illinois Manual Arts Association, a committee was appointed to organize those connected with industrial education in Illinois into a state body to be affiliated with the American Vocational Association. The state and national groups will be composed of instructors in manual arts, agriculture, domestic science and other allied subjects. The members of the committee are Albert Bauersfeld, A. B. Mays, J. F. Kolb, and A. B. McCall.

The agricultural high schools have had a marked growth in Virginia in the past nine years. In 1917 there were 229 students in the state taking some vocational agricultural courses in high schools and in 1925 there were 3,400 students. This is an increase in enrollment fifteen times, while the number of courses has increased ten fold from 18 in 1917, to 186 in 1925.

From the schools where no vocational agricultural courses are given 28.5 per cent of the boys remain on the farms and from the schools where such courses are given 57.7 per cent of the boys remain on the farms. Would this bespeak well for the agricultural high school teachers of the state? Can your state boast of such a record?

Vocational Training for Adults. Training in bricklaying, plumbing, electrical work, vulcanizing, automobile repairing, cobbling and other trades are being offered by the Denver, Colo., schools as a part of the service to adults at the Opportunity School.

Arrangements have also been made for a cooperative school to be conducted at the Union Pacific Shops for the training of locomotive operatives. The equipment is furnished by the railroad and one-half of the salary of the instructor is paid out of the Smith-Hughes funds.

General Shop Plan in Operation. Under the direction of Austin Alden, supervisor of industrial arts in the high school at Westbrook, Me., the manual training department is being operated on the general shop plan. Pupils in the seventh and eighth grades acquire not only a knowledge of wood and woodwork but are given an insight into home mechanics. In the course of a year, twenty or thirty different problems of a simple nature, such as setting glass, wiring electric bells, repairing plaster, painting, packing leaky water faucets, etc., are undertaken. In the second year the course includes some machine work.

First-year high school students are given general woodwork, consisting of carpentry and the construction and repair of furniture. Simple sheet metal and forging are given during this year and cabinet making is offered to all freshmen regardless of the course selected.

Second-year students are given simple machine shop problems, supplemented by an auto-mechanics course. The third and fourth years are distinctly vocational with the definite aim of fitting each boy for a place in industry.

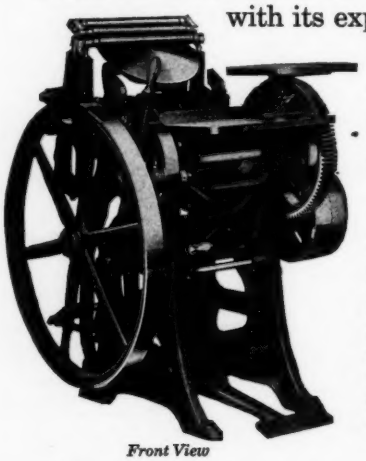
The mechanical drawing courses during the first two years are somewhat general in order to give the pupils a working knowledge of principles and the last two years they are given a definite relation to the shop. In the drafting room the students are given an opportunity to work out the designs and in the pattern shop they are allowed to work out the pattern and to go

(Concluded on Page 36a)

The Major Items for

May be used in practically any type of school

IN ordering equipment, or even in securing quotations of price, it is important that the specifications of each item be exactly stated in order to avoid omissions, substitutions or misunderstanding. Herewith are given model specifications for several items. By writing your specifications according to these models you will be sure to obtain the exact articles you desire. The Education Department of the American Type Founders Company with its expert engineering service will be glad to assist any school in formulating the correct specifications for a printing outfit.



Front View

One C. & P. New Series Platen Press 10x15, complete with single disc, throw-off, gear and pinion guard, depressible grippers, three chases, one brayer, two wrenches, one set of cast rollers, one set of roller stocks, one set of roller trucks, treadle, two extra chases. One Flywheel Guard for 10x15 C. & P. Press. One Platen Guard for 10x15 C. & P. Press.

Note: The C. & P. New Series Press can also be furnished in sizes 8x12, 12x18 and 14½x22. Use the specifications as given for the 10x15 size, substituting the size desired.

Side View

Safety Devices for all C. & P. Presses

Flywheel Guard made of fibre.
Gear and Pinion Guard.
Platen Guard.
Press Brake.
Motor and Motor Bracket.
(The motor bracket is attached direct to the press, making a complete unit.)

These safety devices make the printing press as nearly "childproof" as it is possible to make any type of machine.

Official Hand-Lever Presses are ideal for Linoleum-Block printing. They are made in three sizes, 4x6 inch, 7x9 inch and 8¼x12½ inch. These presses are simple in construction and are easily adjusted. There are no gears or springs to be strained or broken and no occasion for repairs. Each press stands upon a pedestal, combining beauty and strength.

LEGIBILIT
IN TYPE DESIGN

A SERIES of tests and experime made by the British Associati for the Advancement of Science, Clark University, Worcester, Ma the Board of Education of New Y City, the American Type Found Company and others, all go to sh that some styles of type are far m legible than others. It is signific that all the experimenters worki independently arrive at practica the same conclusions as to just wh constitutes the most legible type a therefore best adapted for childre use and general school printing.

Century Schoolbook was design to meet the requirements of colleg and boards of education, at the sa time taking into consideration t conclusions arrived at by the oth authorities. In making these typ every detail has been considered s a great deal of labor, experimenti and calculations have been requir to make them as nearly perfect possible with all dimensions corre For example, the space between letters, height of each character, t weight of each thick and thin li as well as the white spaces within t letter (counters) have been correc dimensioned by proper micromet measurements from a vast amou of experimental data compiled fr many sources. While this series designed primarily for schoolboo storybooks for children, periodica and general school printing, it al makes a splendid letter for job wo and advertising typography becau of its very desirable characteristi

CENTURY SCHOOLBOOK AND CENTURY SCHOOLBOOK BOLD ARE THE TYPES USED IN ABOVE ADVERTISEMENT

School Printing Outfit

ENTURY SCHOOLBOOK TYPE

5 A $7 75 8 a $7 25 $15 00

Enjoyed

5 A $4 45 10 a $5 05 $9 50

Magistrate

6 A $3 95 12 a $4 40 $8 35

Recuperation

8 A $3 20 14 a $3 40 $6 60

Huge Elephants

11 A $2 80 22 a $3 30 $6 10

UROPEAN Merchant

13 A $2 65 24 a $3 00 $5 65

EBATE Interests Boys

16 A $2 60 32 a $3 05 $5 65

UDENT Attends Meeting

20 A $2 40 40 a $2 85 $5 25

RARIES in larger cities have
eived interesting new books

22 A $2 20 44 a $2 55 $4 75

TORIC treasures are given to the
museum by rich manufacturers

26 A $2 05 50 a $2 20 $4 25

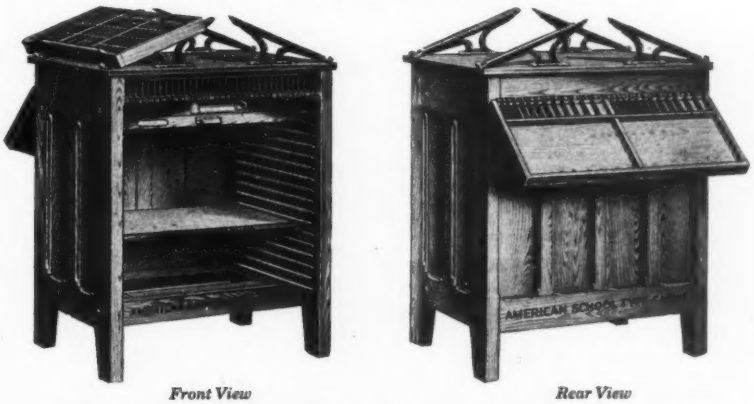
Y business firms use adding machines
other modern labor-saving equipment

28 A $1 75 55 a $2 00 $3 75

BAN audience greatly appreciated long talks by
e professor on subjects of greatest importance

AMERICAN SCHOOL TYPE CABINET

No. 9178; *Made in Wood Only*



Front View *Rear View*

No. 9178 American School Type Cabinet equipped with one full-size blank case, with cabinet front, two pairs of No. 2620 case brackets, one detachable galley dump (for 2 galleys), a lead and slug rack for lengths 10 to 26 picas by picas, and compartments on galley dump for leads and slugs in lengths 4 to 9½ picas by half picas.

AMERICAN SCHOOL IMPOSING TABLE

No. 3977; *Made in Wood Only*

Front View *Rear View*

When furnished with a marble surface and coffin, the working area is 28x36 inches; with an iron surface, 31x39 inches. The height is 38¼ inches. The shipping weight, without contents, is 420 lbs.

Under the working surface there are racks for Reglet Font No. 3730 and Wood Furniture Font No. 3744 and a drawer; galley shelves for 34 galleys and a rack for twelve chases. Ample quantities of reglet and wood furniture are contained in units which are furnished with this imposing table.

FRANK K. PHILLIPS, *Manager,* EDUCATION DEPARTMENT

American Type Founders Company

300 Communipaw Avenue, JERSEY CITY, NEW JERSEY

A Pre-Publication Text of
The Mechanics Institute, New York

Architectural Iron Design and Detailing

(As Required by the Laws of New York)

by

DANIEL M. DRISCOLL

Instructor in Ornamental Iron Detailing, Mechanics Institute, New York

With an Introduction by

LOUIS ROUILLION, B.S., M.A.
Director, Mechanics Institute

Teaches the design and construction of the various units of metal products entering into building construction according to the best practice and governing laws.

DRAWING INSTRUCTION. *There is no better way to learn the law than by drawing an example illustrating it.* With this object in mind the text has been developed with a series of drawing exercises which can be worked out and which instruct in the details as well as in the theory. But the book can be studied and analyzed without the completion of these drawing exercises, for the text material is detailed and gives the law at a glance.

The Chapter Headings Include

Designing and Detailing Stairs—Designing and Detailing Miscellaneous Bronze, Brass and Iron—Designing and Detailing Fire-Escapes—Fabricating and Setting Light Structural Steel—Appendices: Tables—Ornamental Moulding and Shapes—The Building Code (The Tenement House Law—The Labor Law—Code of Ordinances—Rules of the Board of Standards and Appeals).

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☐ If not adopted in my classes } or remit in full.

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School .....

Address .....

I.A.M. 5-26

(Concluded from Page 33a)

to the foundry to see the castings made and finally to the machine shop where the product is completed.

Research Work in Mining. Opportunities for training in research work along mining and metallurgical lines have been arranged by the Bureau of Mines, of the U. S. Department of Commerce and eight colleges and universities, through co-operative agreements providing for the maintenance of research fellowships.

During the year 1926-1927 more than thirty fellowships in eight institutions will be awarded. The problems to be studied cover a wide range of scientific research, and the students will receive remunerative positions in the industrial field. The fellowships are open to graduates of universities and engineering schools with the proper qualifications for undertaking research investigation, and have a value of $540 for a year of nine months.

General Industrial Course Inaugurated. A general industrial course for boys has been introduced in the junior high school and the Science Hill school at Johnson City, Tenn. The course provides for a half day in related subjects and a half day in shop work and has been approved by the federal and state vocational boards. The course is intended to meet the needs of boys employed a part of the day and those preparing to take their places in an industrial or mechanical occupation. To date 24 boys have enrolled for the work.

Indiana Vocational Conferences. A series of conferences for teachers and others interested in vocational education will comprise a part of the year's program in Indiana. During February and March conferences of home economics and industrial teachers were held at Goshen, Linton, Logansport, and Hammond. These meetings were directed by the industrial and home economics divisions of the state education department. The teachers at each of the centers named met for a dinner. At this time addresses were given on topics of general interest by persons engaged in vocational education. The speakers were Dr. H. N. Sherwood, state superintendent of public instruction; Z. N. Smith, state vocational director; Prof. F. J. Breeze of Ball Teachers' College, and L. L. Caldwell, superintendent of the Hammond schools.

The State Society for Vocational Education, under the direction of President Gregory, conducted two conferences for the promotion of vocational education, one meeting being held at Muncie and the other at Seymour.

In addition to these meetings, Purdue University has announced three conferences of particular interest to teachers and others interested in vocational education. The drafting teachers' conference was held April 9th to 10th; the roundup of agricultural and industrial teachers and students will take place May 4th to 7th, and the vocational directors' conference will be held July 8th and 9th in connection with the special summer course in vocational teacher training.

Block Short-Day Plan for Vocational Teachers. An attempt to cut a half-hour from the working day of the teachers of vocational subjects in the New York City schools has been halted by an objection from Commissioner Arthur S. Somers. The board approved a recommendation that the matter be referred to the committee on law.

PERSONAL NEWS

Mr. Horace A. Frommelt, formerly assistant works manager of the Falk Corporation of Milwaukee, has become associated with the International Correspondence Schools at Scranton, Pa., as consultant for its apprentice training division, giving full time to the inauguration of apprentice training programs.

Mr. Frommelt received his M. A. degree at Champion College, and completed his training for the master's degree in electrical engineering at Ames, Ia. Since 1920 he has had charge of apprentices in the shops of the Falk Corporation, and during the two years preceding, he was a member of the faculty of Marquette University in charge of cooperative work.

William M. Feist, who formerly taught in the high school at Janesville, Minnesota, is now connected with the manual training work of the North Strathmore school at Detroit, Mich.

A. V. Larson, who had charge of the manual training work at the high school of Columbia, Nebraska, has been chosen head of the department of manual arts of the State Teachers' College at Peru, Nebraska.

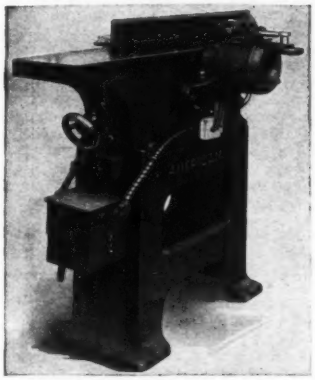
Mr. A. H. Hanson, of the Boys' Technical High School, Milwaukee, Wis., has been elected president of the Wisconsin Vocational and Educational Guidance Association, which held its meeting on March 6th, at Milwaukee. The other officers elected were: Miss R. Groves, of Madison, secretary; Mr. G. B. Cox, of Milwaukee, treasurer.

Mr. C. L. Bailey, formerly director of trade extension work at Cincinnati, O., has accepted a position with the Sheet Steel Trade Extension Committee, of Pittsburgh, Pa. Mr. Bailey was at one time director of the associated building industries of Chicago.

Mr. Joseph B. Funke, a member of the board of vocational education at La Crosse, Wis., has retired after a service of fourteen years as president of that body. The board adopted a resolution expressing its appreciation of the work done by Mr. Funke during his long period of service.

Mr. Lynn E. Stockwell has been appointed to the position of assistant supervisor of classes for teachers of trade and industrial subjects of the (California) southern branch. Mr. Stockwell succeeds Howard A. Campion, who was elected principal and director of the Wiggins Trade School of Los Angeles.

Mr. D. W. Conners, formerly printing instructor at Erie, Pa., has accepted a similar position in the Latimer junior high school, Pittsburgh, Pa.



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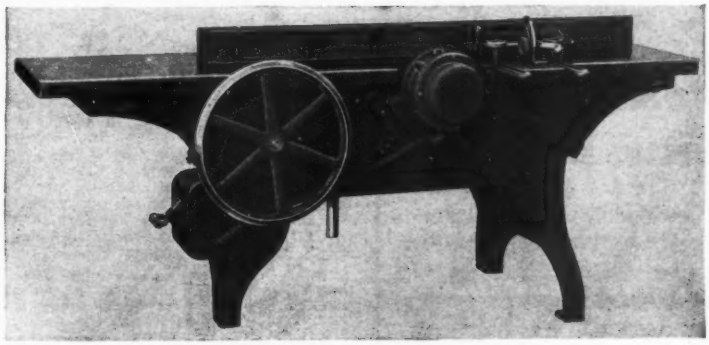
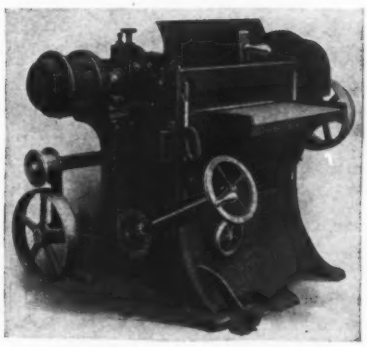


American No. 1 Buzz Planer and Jointer

American Machines spring from the highest requirements of the industries. They are industrial machines.

"The tools of school are the tools of life"



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Educational Department

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You need the New Weber Catalog at your elbow when you make up your requisitions. In its 350 pages you will find drawing instruments, tables, boards, t-squares, triangles—in fact every item that is required by the school drawing room.

This book is of inestimable value for it not only brings together, under one cover, description, illustrations and prices but points the way to the most reliable line of drawing materials. All Weber school products are built with a full appreciation of school-room needs and are unconditionally guaranteed as to workmanship and performance. Write for this valuable book today. Address Dept. I. A.

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WEBER

Drawing Instruments & Materials

NEW BOOKS

Practical Polishing and Staining

By A. W. Parkhouse. Cloth, 121 pages. Price, $3. D. Van Nostrand & Co., New York City.

This book is written wholly from the English standpoint, for which reason it is a total loss, as far as the American cabinet maker is concerned. The author poses as a practical man, but to the skilled foreman of the finishing room of a modern American furniture factory he is a hopeless amateur.

On the very first page is all the evidence needed that he is not acquainted with modern veneer practice when he recommends the use of thicker veneers as a means of producing a better surface for the finish. The American will continue to use much thinner veneers than formerly, since he has learned to properly size his veneers, as well as the practical methods of preparing, seasoning, and sanding his crossbanding ready for the finish veneers; a process which his English cousin apparently has not learned as yet.

Again, he suggests the finishing of as many portions as possible before complete assembly, as though this were a new idea. Your reviewer has three factories on his lists which, for fifteen years, have been exporting completely finished office furniture, knocked down, to ship to England.

He next devotes 51 pages to the process of French polishing, which he repeatedly admits, in one form or another, has no durability, and which requires an amount of labor which no American factory superintendent would tolerate at all.

He has no real acquaintance with modern staining methods, since he speaks of materials which have been off of the American markets for the past ten years, as well as other materials which are more or less useless for the purposes mentioned, due to their fugitive character in the presence of light.

According to his ideas, the "foolproof, unsinkable filler has yet to be found." Any one of a dozen manufacturers in the States could make up any grade of filler, capable of resisting French polish, varnish, or lacquer if need be, which would entirely satisfy the most critical chemist, or specification engineer in existence. The reviewer does not wonder at his statement regarding the perfect filler, when he recommends such unsuitable materials as brick dust, pumice stone, etc. No wonder the English mechanic labors so long and so hard if he is still working with materials discarded in America thirty or forty years ago. Can any American imagine a method which would require that the grain be filled with plaster paris while liquid with water? I hesitate to think what countless deviltries would soon develop in the wood, stain, shellac, or varnish coats on such a foundation.

In treating with the formulae for stains, many of his methods are hopelessly out of date, since the materials can no longer be obtained. Any boy in the elementary courses in American high school chemistry, knows that the statement, "iron acetate can be made by steeping iron filings in dilute sulphuric acid," is hopelessly inaccurate. But why continue ad infinitum?

On the subject of varnishing he is on the whole correct, in the short chapter of four and a half pages; but one suspects that it was all deduced from American varnish publications, rather than actual experience and working knowledge.

The remainder of the book deals with the methods of staining wickerware with obsolete materials; formulae for stains and polishes of no particular value; and a brief mention of spray methods not at all based on actual working experience.

All in all, the book is of no value to the American finishing industry, unless it be as a commentary on the wholly inadequate, and out-of-date methods which apparently exist in England today. Perhaps it furnishes a rather good answer as to the causes of industrial unrest now so prevalent in England due to lack of modern methods and materials. Yesterday's paper published an account of the fact that King George discovered that American typewriters had almost entirely replaced English makes in the Crown offices, and that when he made indignant inquiry of his officials as to the reason was informed that no English make was modern enough to do the work required of the efficient typewriter, and that until Englishmen could produce machines equal to the American, that the latter would continue to be used. The book is attractively printed.—W.

Printing in the Junior High School

A brochure by Arthur Dean. Paper, 24 pages. Published by the American Type Founders Company, Jersey City, N. J.

The junior high school insures safe passage during the transition stage between the elementary and the senior high school, and it is in the junior high school that printing proves its effectiveness. It combines all the skills of a trade which is vocational, and at the same time, utilizes practically all the principles pertaining to literary accomplishments.

The booklet is in the form of a human interest story, describing how the activities of a junior high school center around the school printshop. It offers suggestions about the selection of a printing outfit for the junior high school, lists items recommended as practical, and supplements the whole with endorsements and opinions of prominent educators regarding the educational value of printing in this type of school. To secure an appreciation of the subject from an art standpoint, the reader has only to study the booklet, a product of the American Type Founders Company, to realize that printing effectually combines in teachable form vocational, literary, and art content. A valuable part of the booklet is a page devoted to the objectives of printing instruction in several types of schools, which should be a part of the course of instruction to be installed in any type of school.

AN INTERESTING BIT OF HISTORY

THE American Crayon Company made the world's first blackboard chalks in 1835, about the time the first railroads were being constructed. Contrary to a general impression, however, the colored drawing crayon was unknown until about 1890. At that time, a man who is still active in The American Crayon Company organization, worked out and introduced this medium which has played such an important part in school art development during the intervening years.

Many years ago, Louis Prang introduced the first water colors into American schools. These were imported from Germany until the year 1914. That year, the World War cut off the previous source of supply. Since then The American Crayon Company has made all of these colors at their own factory at Sandusky, Ohio. By the end of the World War, it was realized that the domestic product was superior in every detail to that which had formerly been imported - a source of genuine gratification to every real American.

The American Crayon Company cannot refrain from taking pride in having been so closely identified with the production of the world's first blackboard chalks, colored drawing crayons, and the first water colors used in the American schools.

Referring to "Prang" colors, make sure that the name "Prang" appears on the box - otherwise it is not "Prang."

"Prang" Water Colors and "Prang" Crayons are manufactured and owned only by The American Crayon Company. It alone is the original source of supply.

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The unusual adhesive strength and penetrating qualities make it an ideal glue for all requirements of the woodworking industry and school shops.

Uniformity is guaranteed.

Liberal working sample submitted upon request, in Sheet, Flake or Ground form.

HENRY WILHELM COMPANY, INC.
134-136 Tenth Street PITTSBURGH, PA.

BUYERS' NEWS

Change in Firm Name. The Rhone Electric Company of Minneapolis, Minn., has reorganized and will in future be known as the Sta-Warm Electric Heater Corporation. Mr. Edward F. Sparks, well known in the electrical and technical industries, has been employed as general manager, and the firm's products are now marketed throughout the United States, the European continent, Africa, New Zealand and the Hawaiian Islands.

Due to the increasing demands for the Sta-warm electrical equipment for heating purposes, the company has increased its manufacturing plant by fifty per cent and has added a new working staff to carry out the orders for new equipment.

In the future, special emphasis will be placed upon electric pots and heaters for glue, wax, rubber plastic, and chemicals of various kinds. Sta-warm pots and heaters in stock models, or built to order, afford evenly distributed, automatically fixed heat for every type of fluid used in industry. The firm maintains its standard line of equipment, with several improvements and changes. A number of new models have also been added to the list of products.

RECENT PUBLICATIONS

Issue New Dixon Catalog. The Joseph Dixon Company, of Jersey City, N. J., has just issued its 1926 catalog of school pencils for writing and drawing.

The catalog is in the form of an encyclopedia and has been prepared to make it easy to specify the Dixon school line. The information is grouped, indexed, illustrated and arranged in such form as to make it simple and easy to get at the material needed. The catalog contains numerous plates. School authorities who are interested in the new catalog may obtain a copy by writing to the Dixon Company at Jersey City.

Everyday Art. A monthly publication issued by the American Crayon Co., at Sandusky, O. The March issue contains an article on water colors by Pedro Lemos, another article on the making of colored papers by Margaret Fitzpatrick, an article on blackboard work, one on junior high school art work, one on art and its value by C. Valentine Kirby, and one on the need of art by R. C. Hall. The issue contains some fine reproductions of art designs worked out in the schools.

NEW TRADE PRODUCTS

New Johnson Oven Type Furnace. The Johnson Gas Appliance Company, of Cedar Rapids, Ia., has just put on the market its new oven furnace No. 700 for use in carbonizing, hardening, and annealing. The furnace is of the atmospheric type, using a direct-jet Bunsen burner, which does not require the use of a forced air blast of any kind, making it more economical and less troublesome to operate. It requires a floor space only 27 inches square, is rapid in operation and perfect in results, and can be regulated to produce heat up to 2,300 degrees Fahrenheit.

The furnace comes equipped with six large Bunsen burners, each with shut-off valves for temperature regulation, and sells at a list price of $180, a very low price for a furnace of this type and size.

New Portable Universal Saw. The J. D. Wallace Co., Chicago, Ill., has announced the marketing of its new Wallace portable universal saw, the latest addition to the company's line of popular woodworking machines.

The saw is of the portable floor type of universal circular saw which combines all the advantages of the portable bench machine and the self-contained floor type. The one-way castors make it easy to move from one department of the shop to another and yet is perfectly rigid in operation. The motor and working parts are built into the upper section with the table and fences, so that the top part is a complete self-contained bench type saw when lifted from the stand.

The Wallace portable saw is equipped with a one H.P. three-phase motor, having great cutting capacity with precision accuracy, and a large size table with a capacity of 12"x2¼" between the blade and fence.

A constant speed air-cooled motor is geared to the saw spindle, thus eliminating all belts and their attendant troubles. Ball bearings on the motor are provided with an adjustment for taking up any play. Saw spindle bearings and gears are automatically lubricated by a splash oil system.

The ripping fence resembles a T-square and is clamped rigidly in any position to a rail at the front of the machine under the edge of the table. Two cross cut fences are provided so that right or left mitering up to 50 degrees can be done, the angle being indicated on a degree plate located on each fence. The saw blade above the table is protected by the patented Wallace shutter saw guard which acts automatically in protecting the running saw blade. The saw is protected by a fixed cage guard.

Shop teachers interested in this type of portable saw may obtain a copy of the catalog by writing to the J. D. Wallace Company at 134 S. California Ave., Chicago, Ill.

COMMERCIAL EXHIBITS AT DES MOINES

The commercial exhibits attracted considerable attention on the part of the school men and were well attended. Located on the Mezzanine floor and in the lobby of the Fort Des Moines Hotel, convenient opportunity was given to visit the displays and learn of the new products offered by manufacturers. Thirty concerns were represented. Among the exhibitors are the following:

AMERICAN CRAYON CO., Sandusky, Ohio.—School art and artists' materials, particularly "Reliefo," a gesso clay in ten

(Concluded on Page 42a)

FIRST ATTEMPT IN Art Fibre Weaving

"DECIDEDLY SUCCESSFUL"

6th, 7th, and 8th GRADE WORK TAKES THIRD PRIZE AT FARMER'S INSTITUTE

Which proves our contention that Art-Fibre Weaving can be taught with great success in all grades from the 6th up, also in small as well as in large schools.

Art-Fibre Weaving is furniture, basket and tray weaving and offers just the right training to make the hands strong and the fingers nimble and quick to carry out mental commands. The work is interest inspiring because you and your classes can choose from more than 100 projects and select just the proper assortment that will have the greatest appeal to the greatest number, yet the same supervision will suffice.

All materials are furnished complete for more than 100 projects. You merely order the project and we will send just the right amount of materials for weaving and finishing in your choice of varnish, enamel or duo-tone enamel finishes.

Art-Fibre, the weaving material used, is worked dry. There is no wetting or soaking, classes start promptly and the work progresses rapidly.

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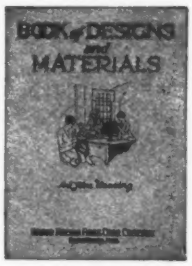

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E. C. ATKINS & CO., Indianapolis, Ind.—Atkins Silver Steel Saws were shown, featuring the Silver Steel demonstration saw and set of lessons covering the filing and setting of saws.

BARNHART BROS. & SPINDLER, Chicago, Ill.—The exhibit consisted of printed specimens by students from the United States, from the trade schools of Leipsig, Stuttgart, Karlsruhe, Germany, and London School of Printing and Camberwell School of Arts and Crafts, London, England.

DEVOE & RAYNOLDS CO., New York, Chicago. Artists' materials and artists' supplies, including water and oil colors.

HENRY DISSTON & SONS, Philadelphia, Pa.—The New Disston D-18 Saw with the Disstonite handle was featured in the complete display of saws. The Disston Saw and Groover with changeable and adjustable saw teeth was shown.

JOSEPH DIXON CDUCIBLE CO., Jersey City, N. J.—Lead pencils, crayons and erasers including Prestile Colored Crayons.

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S. C. JOHNSON & SON, Racine, Wis.—Johnson's Wood Finishes were demonstrated in their exhibit.

MONROE CALCULATING MACHINE CO., Orange, N. J.—The Monroe High Speed Adding Calculator was demonstrated and its use explained in connection with a "formula method" of teaching arithmetic.

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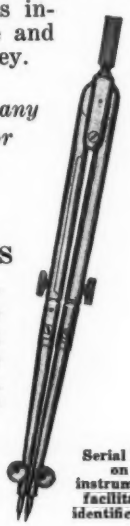

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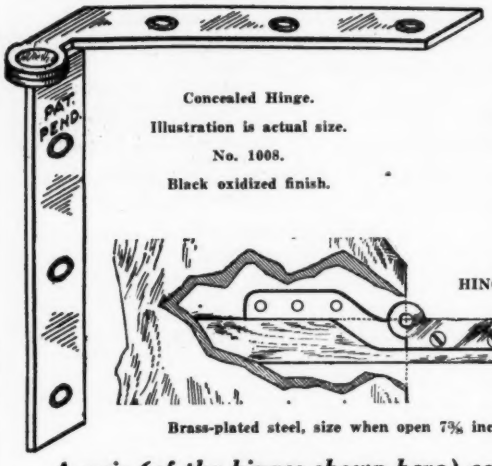

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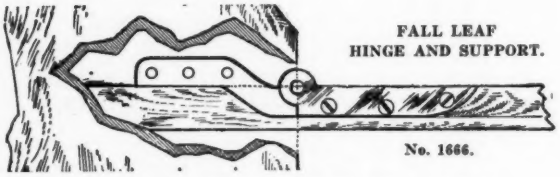

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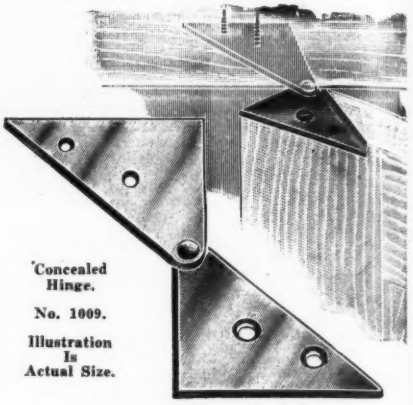

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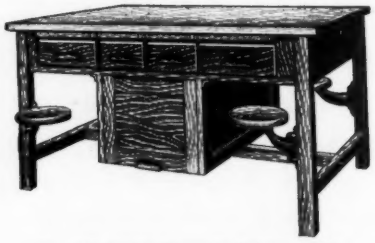

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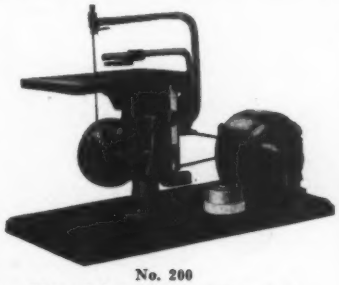

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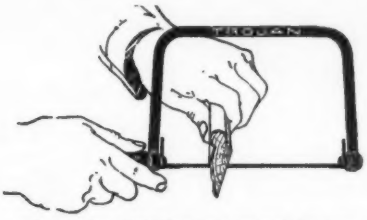

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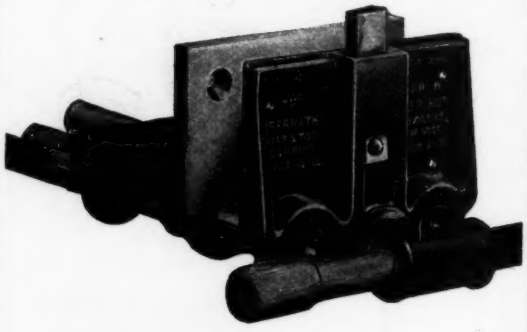

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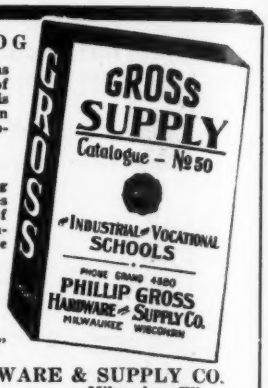

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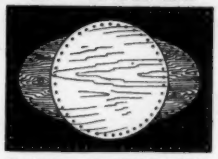

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The ELDORADO PAGE

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THE study of foliage might well begin with evergreens. They are relatively easy to manage, as their foliage usually conceals trunk and branch structure. However, their contours are important and should be carefully indicated with light lines at the outset.

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Cedars are valuable in landscape effects because of their decorative silhouettes. It is natural, therefore, to render them in this manner. When placed against a dark background, however, they must be light in tone and rendered in light and shade as in the lower drawing on this page.

Try building up the tree masses with stroke groupings like these shown. Combine broad strokes with thin, sharp lines for evergreen character.

* * *

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Previously purchased		1
Kenfield-Leach Co.	Chicago, Ill.	2
Monroe F. Dreher	Newark, N. J.	1
L. H. Thompson	Brewer, Me.	1
Previously purchased		1
Universal Press	Brooklyn, N. Y.	1
Advance Printing Service	Boston, Mass.	1
American Printing Co.	New York, N. Y.	1
Previously purchased		1
The Brooks Co.	Cleveland, Ohio	1
Previously purchased		2
Evening News Co.	Bridgeton, N. J.	1
Whitney Duplicating Check Co.	New York, N. Y.	1
Bank Printing Co.	Los Angeles, Calif.	1
Nehoc Press	New York, N. Y.	1
Lyman F. Black	Elgin, Ill.	1
C. Wolber Co.	Newark, N. J.	1
Previously purchased		2
Geo. E. Crosby Co.	Boston, Mass.	1
Previously purchased		1
Regal Art Press	Troy, N. Y.	1
Born Printing House	Philadelphia, Pa.	1
Schneider Printing Co.	Palmyra, Pa.	1
Previously purchased		1
Gleeson Bros.	Chicago, Ill.	1
Theatrical Adv. Co.	Detroit, Mich.	1
Philadelphia Rapid Transit Co.	Philadelphia, Pa.	1
Reist & Meidel	Buffalo, N. Y.	1
Hersee Co.	Los Angeles, Calif.	1
Review Pub. & Ptg. Co.	Savannah, Ga.	1
Colonial Press	Philadelphia, Pa.	1
The Stotts & Superior Ptg. Co.	Detroit, Mich.	1
W. G. Gilkey Printing Co.	Cleveland, Ohio	1
Previously purchased		1
Burland Printing Co.	New York, N. Y.	2
Hollywood Paper Box Corp.	Hollywood, Calif.	1
Castleman & Doxen	Chicago, Ill.	1
Rust Craft Publishers	Boston, Mass.	2
Previously purchased		2
Bureau of Engraving Inc.	Minneapolis, Minn.	1
Bankers Life Co.	Des Moines, Iowa	1
Previously purchased		1
Detroit Press	Detroit, Mich.	2
Presses shipped abroad		10
Previously shipped abroad		407

Shipments for February, 1926—90 Miehle Verticals

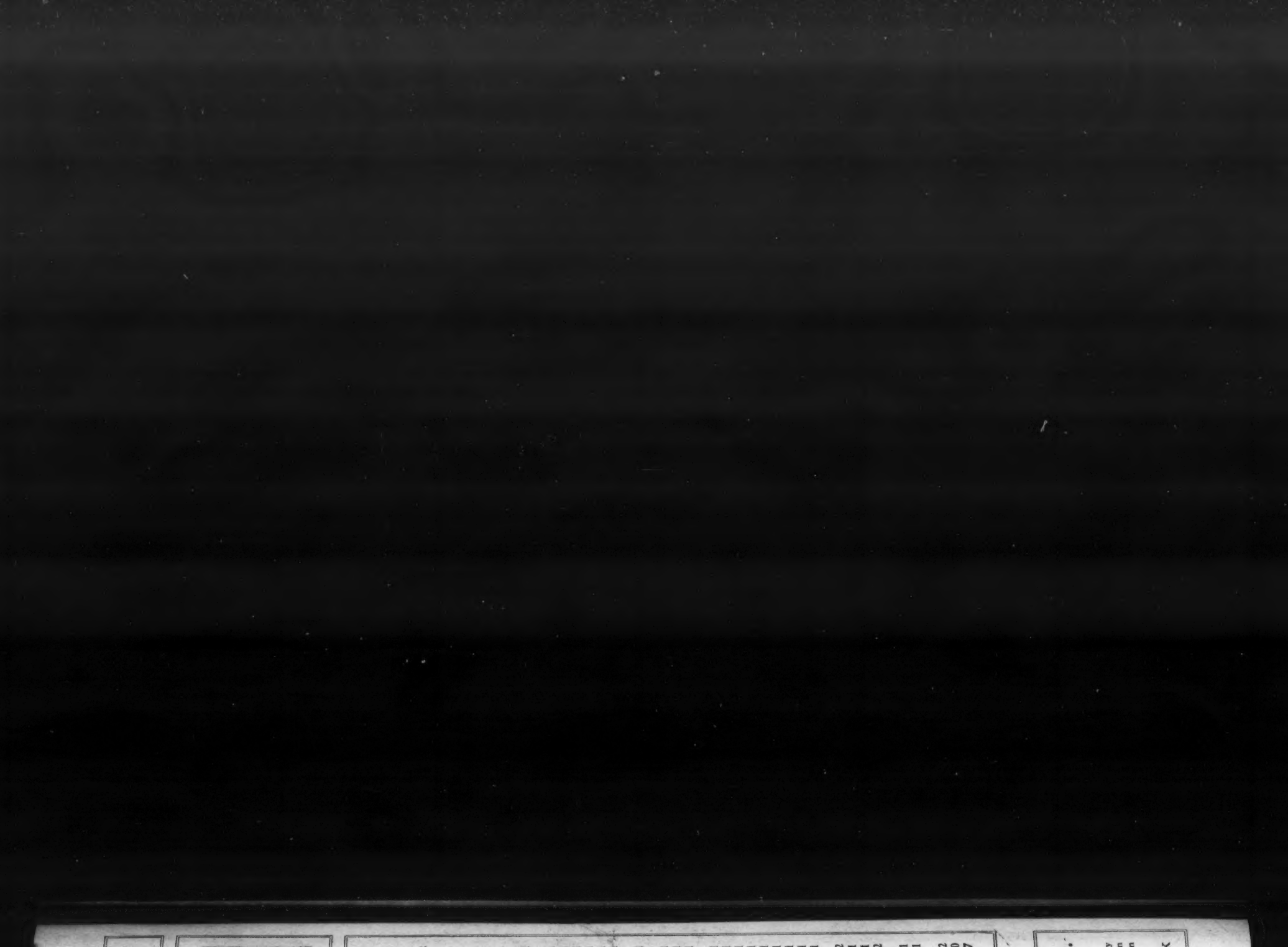
MIEHLE PRINTING PRESS & MANUFACTURING CO.

Main Office and Factory

Fourteenth and Robey Streets
CHICAGO

Sales Offices:

PHILADELPHIA
BOSTON
DALLAS
SAN FRANCISCO
LOS ANGELES
ATLANTA, Dodson Printers' Supply Company
OKLAHOMA CITY, Western Newspaper Union
SALT LAKE CITY, Western Newspaper Union

Operating Exhibits:

Transportation Building, Chicago
Printing Crafts Building, New York